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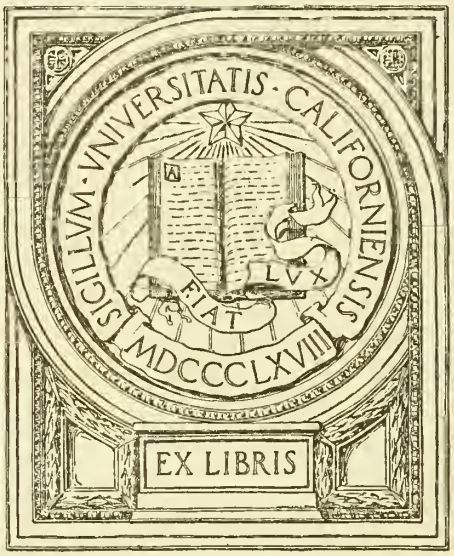

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society

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VOL. XII JANUARY, 1929 No. 1

REPORTABLE DISEASES IN MINNESOTA*

A. J. Chesley, M.D.
Executive Officer, State Board of Health
Saint Paul

THE State Board regulations divide notifiable diseases into two groups: rare diseases, to be reported direct to the Board for instruction relative to control; and common diseases, which are reported to local health officers and by them to the Board. Telephonic or telegraphic reports collect are requested for poliomyelitis, epidemic meningitis and encephalitis direct to the Division of Preventable Diseases.

Measles and *whooping cough* are not reported fully, probably because people do not realize the danger and call a physician. This is serious for "No health department, state or local, can effectively prevent or control disease without knowledge of when, where and under what conditions cases are occurring."

In 1927 only 5,618 cases of measles were reported with 58 deaths, of which 37, or 65 per cent, were under five years of age. Only 1,031 cases of whooping cough were reported, with 75 deaths, of which 73, or 97 per cent, were under five years of age.

In ten years 1918-1927 of all deaths due to *scarlet fever* 42.6 per cent occurred under five years of age; measles 70.5 per cent and whooping cough 95 per cent were under five years of age.†

Vaccination for *smallpox* was so thorough as a result of the epidemic of 1924-25, when 504 deaths occurred in twenty months, that there has not been a single smallpox death since then. In 1926 there were 281 cases, in 1927 only 126 cases. The fatality of *malignant* smallpox in the epidemics of 1917 and 1924-25 was more than 25 per cent: 510 deaths in 2,033 cases. The fatality of the *mild* type of smallpox 1913-1927 was less than 0.3 per cent: 103 deaths in 37,624 cases.

Minnesota was a pioneer in applying the culture method of control in diphtheria. In October, 1894, Dr. Hewitt began routine state-wide culture examinations. Of recent years 1901 had the largest number of deaths from diphtheria—784, or 43.9 per 100,000 population.

Antitoxin was secured for local health officers at reduced rates in November, 1906. The legislature gave $5,000 for free antitoxin in 1915 when the Board established 283 distribution stations. Now there are 386 such stations where any physician can obtain antitoxin free of charge.

The general use of antitoxin reduced diphtheria deaths from 566 or 27.1 per 100,000 in 1910 to 243 or 10.2 in 1920 and to 231 or 9.0 in 1925.

Since April, 1926, when the Board first secured diphtheria toxin-antitoxin for free distribution, the reduction has been accelerated. In 1926 there were 151 deaths, a rate of 5.97, and in 1927 only 82 deaths or 3.05 per 100,000. In 1927 the Division of Preventable Diseases investigated 34 diphtheria outbreaks, received reports of 1935 cases, examined 35,792 cultures and made 314 virulence tests on guinea pigs.

Diphtheria can be eradicated if the discoveries of scientific medicine are systematically and persistently applied. Its cause and its mode of spread are known. A means for exact diagnosis, a specific remedy for treatment which also gives temporary immunity, a reliable test for susceptibility, a safe agent for producing lasting immunity are all at hand. Family physicians must immunize babies to stop the loss of child life, for 1,448, or 67.6 per cent, of all diphtheria deaths from 1918 to 1927, inclusive, were children under ten years of age, while 781, or 36.51 per cent, were

*Read before the Southern Minnesota Medical Association, Rochester, Minn., Oct. 3, 1928.

†1927 Measles: 45, or 77.5 per cent, of all deaths (58) were reported ONLY by death certificate.

Scarlet Fever: 33, or 35.8 per cent, of all deaths (92) were reported ONLY by death certificate.

Whooping Cough: 59, or 78.6 per cent of all deaths (75) were reported ONLY by death certificate.

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under five years of age. In this age group the fatality rate is 13.42 or twice that of children between five and ten years.

The Minnesota State Board of Health believes that the County and District Medical Societies should initiate and actively participate in systematic county-wide diphtheria immunization work in coöperation with the health officers and the school authorities; that public schools as well as public and private hospitals and clinics should be used as inoculation centers; that special effort should be made to get parents to protect all children between six months and twelve years of age against diphtheria through the use of toxin-antitoxin.

It is suggested that the family physician make it a rule to explain to the parents at the time a baby is born that the period of greatest susceptibility to diphtheria is eighteen months to six years, that the most favorable time to give toxin-antitoxin is between six and twelve months, then remind the parents of those facts at the proper time and immunize the child. This would save many lives now sacrificed to diphtheria. Also it would obviate the need for immunization of children of school age and would establish the only system by which the eradication of diphtheria can be assured, namely, immunization of young children by their family physician.

Dr. F. F. Wesbrook, Director of Laboratories, made the Widal test a routine procedure in Minnesota in November, 1896, and the Division of Preventable Diseases has all the reports on file now. Also it has filed by county, sanitary district and family name all reports of *typhoid* cases and deaths since January 1, 1913.

This central file of records and of epidemiological field reports sometimes enables the director to correlate widely separated cases due to a common source which is unsuspected by the patient or his physician. In tracing carriers these records are often of great value. Since the human body is the only reservoir of typhoid infection the identification of carriers is extremely important. For seven years the Division of Preventable Diseases has followed up typhoid convalescents whose occupation was such that they would become a menace if they remained carriers of typhoid bacilli. All typhoid convalescents should be supervised in this way and that may be done later. Restriction on occupation, etc., is kept up until the Widal reaction is absent and three or more sets of bowel and bladder discharges collected at considerable intervals have been negative on isolation tests for typhoid bacilli. Then restrictions are removed but the individual is always warned to be careful since the negative laboratory findings are not conclusive proof of freedom from infection for sometimes the organisms are so few or are excreted so infrequently that they were not found by the laboratory tests.

Typhoid occurs chiefly at ages that give an average expectancy of life of 20 years or more so we estimate the probable number of carriers in Minnesota as follows: Typhoid deaths 20 years, *i.e.,* 1908-1927, 2,303; cases estimated to be ten times the deaths or 23,030; the survivors then numbered 20,727 and if 3 per cent remain carriers there would be 621 in Minnesota.

Since January 1, 1913, the Division of Preventable Diseases has identified 187 carriers (exclusive of those in state institutions) and traced to them 875 cases including 62 deaths. These carriers were nearly all identified by the epidemiologist in tracing the source of infection of an outbreak and of course in every case the laboratory has isolated typhoid bacilli from the carrier's bowel or bladder discharges or both.

In 1910 there were 688 typhoid deaths or 33.1 per 100,000. In 1927 there were 28 deaths or 1.04 per 100,000. This reduction of typhoid fever has been brought about through the coöperative work of the Divisions of Sanitation and Preventable Diseases with local health officers. In 1927 the Division of Preventable Diseases made 111 epidemiological investigations of typhoid, did Widal tests for diagnosis on 5,708 blood specimens, and isolation tests on 1,797 specimens of discharges.

Public water supplies and pasteurization plants are supervised by the Division of Sanitation and safe water and milk are essential in typhoid prevention. With the epidemiologist, the bacteriologist, the sanitary engineer and the milk sanitarian doing good team work with the local health authorities the eradication of typhoid is possible.

These points have been cited in relation to a few diseases to show that the reports made by physicians are used constantly in routine public health work for the promotion of the welfare of the people of Minnesota.

Minnesota was admitted to the United States Registration Area for deaths in 1910. The

Board has confidence in the reliability of the mortality statistics for many years before 1910 but the morbidity statistics of 1910 are unreliable in all reportable diseases and in certain ones are unsatisfactory today.

To illustrate the use of mortality and morbidity statistics let us consider the five leading causes of deaths with death rates per 100,000 in Minnesota 1910-1927.

Year	Disease	Number of Deaths	Death rate Per 100,000 population
1910	Tuberculosis	2270	109.0
	Heart Disease	1934	92.9
	Pneumonia	1933	92.81
	External Causes	1806	86.72
	Cancer	1391	66.79
1915	Heart Disease	2516	112.2
	Tuberculosis	2281	101.52
	Pneumonia	2117	94.22
	External Causes	1918	85.36
	Cancer	1780	79.22
1920	Heart Disease	2985	125.05
	Cancer	2285	95.4
	Tuberculosis	2157	90.35
	External Causes	1843	77.21
	Pneumonia	1506	63.09
1925	Heart Disease	3671	143.19
	Cancer	2723	106.2
	External Causes	2105	82.11
	Pneumonia	1845	71.97
	Tuberculosis	1587	61.9
1927	Heart Disease	4208	159.3
	Cancer	2738	101.93
	External Causes	1997	74.34
	Pneumonia	1696	63.14
	Tuberculosis	1569	58.41

"Heart Disease" in 1914 displaced Tuberculosis as the leading cause of death with a rate of 113.9 against Tuberculosis with 107.86 and has maintained first place since then.

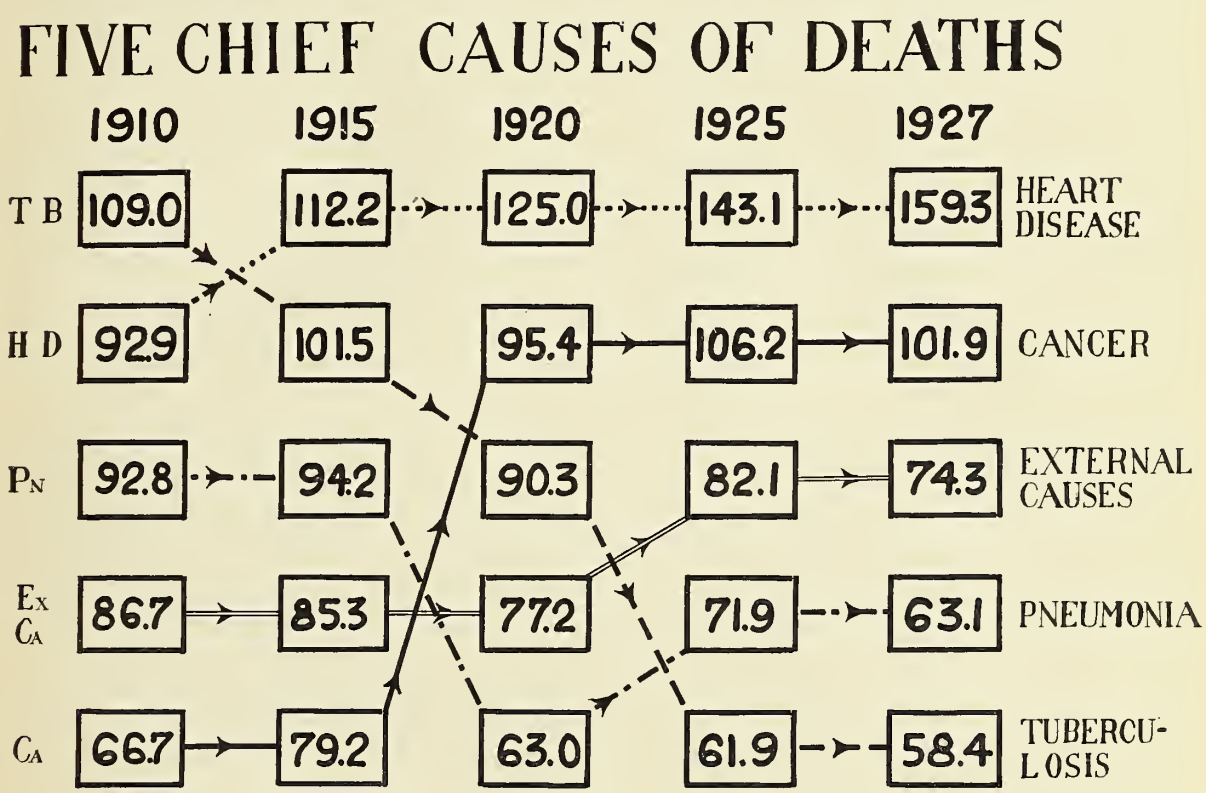

Fig. 1. Death rates per 100,000 population.

Should the Board require reports of acute rheumatic fever because of its relation to heart disease and its probable communicability? Should special study be made to determine what causative factors are susceptible to control measures?

Syphilis the pathologists tell us is responsible for from 8 to 10 per cent of the deaths from heart disease although you guardian angels of the reputation of the decedents seldom enter it on death certificates. Surveys of institutions show that about 15 per cent of the inmates who are public charges are victims of syphilis. Estimates vary from 7 to 30 per cent of still-births due to syphilis but as report is not required in Minnesota for a child that has not advanced to the fifth month of utero-gestation the still-birth re-

ports do not cover the effect of syphilis in the earlier months of pregnancy.

In 1927 there were 1,516 still-birth reports received—93.35 per cent from physicians, 1.95 per cent from midwives and 4.7 per cent from other informants. Of the *total births* nearly 3 per cent were still-births.

Venereal disease case reports by number or by name have been required by State Board regulation since January 8, 1918. In 1925 the social service handled 10,741 cases. In 1927 owing to reduced funds only 6,863 cases were handled. January to June (inclusive) 1928 the social service covered 3,268 cases and 2,247 case reports were received for syphilis, 2,377 for gonorrhea and 7 for chancroid. During these six months the laboratory examined 22,975 Wassermanns, 4,812 G. C. Smears and 566 Spinal Fluids.

The Board knows that the medical profession appreciates the free laboratory service and such social service as it has been possible to give to bring about adequate treatment of delinquent syphilitics, but is the Board justified in using public funds when the social service is very incomplete and no educational work can be done? Syphilis is curable. If the Board does its duty to the doctors and the taxpayers it should see that patients remain under treatment until cured.

"Cancer" ranks second. Should it be reported? What, if anything, should the State Board of Health do about Cancer?

The Massachusetts Health Department conducts a 90 bed cancer hospital with four specialists as consultants and eight on the visiting staff; also has six cancer clinics and is organizing five others through local medical committees. A campaign of education through newspapers, meetings, exhibits and studies in connection with the social service of the Massachusetts General Hospital, the Boston Dispensary, and a house-to-house canvass in certain cities has been conducted. Nearly two-thirds of 1,360 patients in the first year came to the clinics as a result of newspaper publicity. The study of higher prevalence of cancer among those with foreign born parents as compared with those of native born parents has been published

"External Causes" ranks third. Suicides and homicides are included. Preventable accidents, especially automobile casualties, which are second only to traumatism by falls, still increase in number. Recently a Minnesota Safety Council was organized and the State Board will aid its work but this field cannot be covered until a Division of Industrial Hygiene is established in the State Health Department, the Industrial Commission or as an independent agency. No agency now has medical experts or laboratory facilities for Industrial Hygiene work. Only fatal accidents and those in which industrial compensation is sought are regularly reported.

"Pneumonia" ranks fourth. State Board regulations require reporting of primary cases and of pneumonia following influenza and measles but practically no reports are received except through death certificates. Certain measures have been carried out with considerable success in large cities but the State Board does not think that such measures can be applied throughout Minnesota and therefore has made regulations for control of pneumonia.

"Tuberculosis" ranks fifth. Dr. Charles N. Hewitt, the first secretary of the Board, began sputum examinations in 1891. Later because physicians did not report names of cases sputum examinations were discontinued. In 1906 the Board required case reports by regulation and resumed sputum examinations. In 1910 only 682 case reports were received although 2,270 deaths from tuberculosis occurred. In 1913 the legislature passed a special law requiring the reporting of tuberculosis and for the first time more case than death reports were received, *i.e.*, 2,518 cases, 2,357 deaths. During the past ten years 1918-1927 more than one-third (6,565) of 18,800 fatal cases were reported only by death certificate.* The Division of Preventable Diseases has kept special files for living cases and for deaths since January 1, 1913. On December 31, 1927, the Division had records for 36,665 presumably living cases of tuberculosis. Each year all the deaths and cases reported are listed alphabetically by family name for each of the 87 counties. These lists naturally contain names of some persons who have died of other causes and tuberculosis was not mentioned on the death-certificate but they are very useful for county surveys and routine follow-up since they cover a period of fifteen years. Some day sufficient trained personnel may be provided for proper follow-up of tuberculosis cases but at present there seems no prospect that full time county or district health departments will be organized.

*1927—542 fatal cases had not been previously reported.

Where they exist, tuberculosis work forms an important part of the public health program.

St. Louis is the only county with a full time health department. Dr. H. G. Lampson organized and conducted this department until his death a year ago, when he was succeeded by Dr. G. J. Ferreira, who, like Dr. Lampson, has special training and unusual skill in tuberculosis diagnosis. The field work in St. Louis county was planned by Dr. A. T. Laird of Nopeming, Dr. Robinson Bosworth of the State Advisory Commission, Dr. Lampson and the State Board of Health.

In 1927 the Division of Preventable Diseases received 3,819 case reports and 1,569 death reports which are checked against previous case reports. The laboratory made 706 animal tests for diagnosis and 8,208 sputum examinations. Twenty-three epidemiological investigations of tuberculosis were made, but it is impossible to carry on studies of tuberculosis problems which Dr. O. McDaniel, Director, Division of Preventable Diseases and Dr. W. P. Greene, Senior Epidemiologist, have in mind when there are but two epidemiologists for all work in all diseases. Special studies made in previous years for specific purposes were very valuable.

Should the Board ask for funds to carry out a state-wide program similar to the Ten Year Juvenile Tuberculosis Programs of Massachusetts?

Physicians assume a great responsibility and render a public service in making reports of deaths and sickness, for the State Board of Health must depend largely upon these reports to guide its public health policies.

DRUG ADDICTION

Many wild "estimates" have been made in recent years of the numbers of "drug addicts" in the United States. It is hard to understand how—and harder to understand why—some of these "estimates" were made. When, after all the guesses and propaganda, we can find figures that are based on facts, even though they are small, we are really pleased.

The Marine Hospital, operated by the U. S. Public Health Service, discharged 98,714 patients in the years 1925, 1926 and 1927. Of this large number, fifty-five were classified as "Cases of Drug Addiction." In 1925, there were thirty, in 1926, seventeen, and in 1927, only eight. The total number of patients was greater in 1926 than in 1925, and greater in 1927 than in 1926, but the number of cases of addiction went down 50 per cent in 1926 and again in 1927.

These figures are from a report of the U. S. Public Health Service. They are small but significant, because the Marine Hospitals probably get their full share of "addicts."—A. M. A. Bulletin.

DEATHS FROM CONTAMINATED TOXIN-ANTITOXIN

At Bundaburg, Australia, last January, twelve of twenty-one children inoculated with diphtheria toxin-antitoxin at one time died within the next few days. An extensive investigation was made into the causes of the fatalities. The mixture used was issued in rubber-capped bottles, but without the addition of an antiseptic, in order to avoid possible risk from freezing. Each bottle was to be used at one time, but this was not done at first, and fluid was withdrawn from one bottle several times in the course of a week. The investigation brought out that the symptoms and the postmortem and bacteriologic observations were all suggestive of an overwhelming infection with staphylococci. Evidently the vial was contaminated during the previous injections, and in the absence of an antiseptic the organisms multiplied in the fluid. (Jour. A. M. A., November 17, 1928, p. 1553.)

FRACTURE OF THE ANKLE JOINT*

O. W. Parker, M.D., F.A.C.S.
Ely, Minnesota

FRACTURES are of great antiquity in the practice of medicine and surgery and, although the medical man has had to deal with them since the earliest time or, as Cotton says, since the Nordic first wore brogans, still, in spite of all this, we cannot say that the last word has been said.

In late years an interest in fractures has been stimulated by compensation laws, by an increase in traumatic surgery, by the greater demand that has been made on the surgeon for good results by the compensation boards, insurance companies, employing companies, the injured themselves, and by the increasing knowledge that has come from the use of *x*-rays in the study and treatment of fractures.

There is no doubt that fractures, from the standpoint of malpractice suits, constitute one of the most dangerous fields in the practice of medicine. They also present some of the most difficult problems in practice. Dr. John B. Murphy at one time said, while he was operating on a fractured surgical neck of the humerus, which was also dislocated, that he would rather do 100 operations for appendicitis than one of these cases, so far as the hard work and responsibility were concerned.

A study of the history of fractures of the ankle joint presents a fascinating story and reveals the great names in medicine of Pott, Dupuytren, Sir Astley Cooper, Maisonneuve, and, in more modern times, Stimson, Speed, Ashhurst, Scudder, Cotton, Platt, and many others who have studied these fractures and performed many experiments and added very materially to the sum total of knowledge of the lesions in these ankle joint fractures. Injuries and fractures about the ankle joint must have been problems in practice presented frequently to both the ancients and surgeons of the middle ages. It is said, however, that there is not much to be found in the writings of Hippocrates or Ambrose Pare, or other great masters of that period regarding their fractures. Not until Petit, 1674-1750, and Percival Pott, 1713-1788, and Pouteau, 1725-1775, and later Dupuytren and Sir Astley Cooper, about 1822, and still later, Maisonneuve, about 1840 (all names of men who helped splendidly in the evolution of the surgery of fractures)—not until these men began to teach that these injuries, which had heretofore always been classed as dislocations of the ankle joint, were always accompanied by fracture of one or both bones of the leg as well as dislocation, was it really known what the true lesions in these injuries were.

English and American surgeons usually speak of ankle fractures as Pott's fractures. As there are many types of ankle fractures it is often confusing to know just what is meant by a Pott's fracture. Ashhurst says Pott described a fracture which does not exist. Others, in the literature, including Colvin and Speed, say that Pott's fracture, in the strict sense, is a rare fracture. In Pott's classical illustration he speaks of an injury which consisted in a transverse fracture of the fibula about two and one-half inches above the malleolar tip combined with a rupture of the internal lateral ligament with marked outward displacement of the foot. One gathers from the literature that the general understanding among medical men is that a Pott's fracture consists of the following lesions, depending upon the degree of the fracturing force:

1. Fracture of the fibula within two and one-half inches of the tip of the malleolus due to eversion of the foot.

2. If the fracturing force continues, a laceration of the internal lateral ligament or fracture of the internal malleolus due to traction on the internal lateral ligament.

3. If the fracturing force still continues, a laceration of the interosseous and tibio-fibular ligaments is produced. This is the most important factor in the causation of untoward results in treatment.

4. The fracturing force continuing still further, producing dislocation outward and backward of the foot en masse.

*Presented before the Minnesota Academy of Medicine, Oct. 10, 1928.

5. An occasional dislocation forward of the tibia of the astragalus.

Murphy emphasized, in his clinics, the above definition of a Pott's fracture, always stating to his students that a Pott's fracture was an eversion fracture. Whether we accept Ashhurst's statement that Pott described a fracture that does not exist, or whether we believe that Pott's fracture should be limited to the rare fracture he is said to have described, it seems that we should not fail to give Pott great credit and that it is fair to assume that, in spite of the strict interpretation of his writings, he was really speaking of the great group of ankle fractures caused by external rotation or eversion and abduction which constituted, in Ashhurst's series of 300 cases, 82 per cent of all ankle fractures. We should remember that Pott did not have the *x*-ray, which has told us so much regarding fractures. It is quite likely that no one today could accurately describe a fracture of which little had been known heretofore without the aid of the *x*-ray and be sure that his statements could stand the test of future knowledge.

The name of the great Percival Pott is so intimately associated in the minds of English and American surgeons with fractures of the ankle joint that it is of interest to relate the following incident taken from his biography. In 1756 an accident befell Percival Pott which made his name world famous. As he was riding in Kent Street, Southward, he was thrown from his horse and suffered a compound fracture of the leg, the bone being forced through the integuments. Conscious of the dangers attendant on fractures of this nature, and thoroughly aware how much they may be increased by rough treatment or improper position, he would not suffer himself to be moved until he had made the necessary dispositions. He sent to Westminster, then the nearest place, for two chairmen to bring their poles, and patiently lay on the wet pavement, it being the middle of January, until they arrived. In this situation he purchased a door to which he made them nail their poles. When all was ready he caused himself to be laid on it and was carried through Southward, over London Bridge to Walling Street, near St. Paul's, where he had lived for some time. At a consultation of surgeons, the case was thought so desperate as to require immediate amputation. Mr. Pott, convinced that no one could be a proper judge in his own case, submitted to their opinion and the proper instruments were actually gotten ready when Mr. Nourse, his former master and then colleague at St. Bartholomew"s Hospital, who had been prevented from coming sooner,

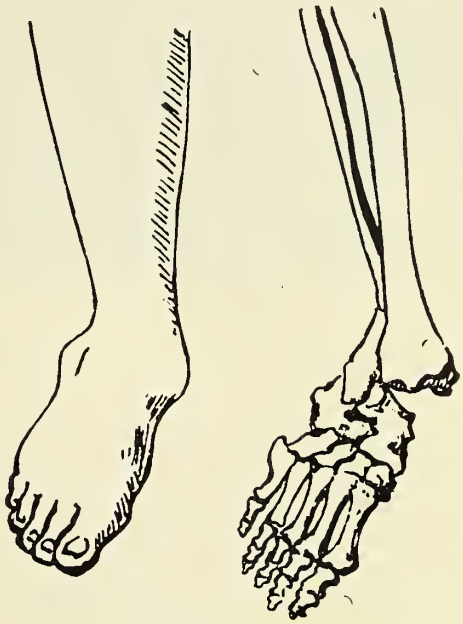

Fig. 1. Copy of Pott's original illustration.

fortunately entered the room. After examining the limb he conceived that there was a possibility of preserving it and an attempt to save it was acquiesced in and succeeded.

The term "Pott's fracture" is still commonly applied to the particular variety of broken ankle which he sustained on this occasion. This accident secured Pott fame along another line as well, for it was during the forced leisure of his convalescence that he first turned his attention to writing and began his treatise on ruptures which, after the lapse of 165 years, may still be read with advantage and instruction. As to whether Pott actually suffered from a so-called Pott's fracture there is some dispute in the literature. Mr. Harry Platt says it is often stated that Pott obtained first hand knowledge of the fracture with which his name has become inseparably associated, as a result of a personal accident, but this is untrue, for the injury sustained by Pott was a fracture of the shaft of the tibia from which he made an excellent recovery.

Dupuytren, the brilliant French surgeon, who lived from 1777 to 1835, was the next to contribute greatly to the knowledge of ankle joint frac-

Fig. 2. Simple oblique fracture of fibula. Mechanism, external rotation. Note that the fracture is higher behind than in front. This is true of all such fractures.

Fig. 3. Fracture external and internal malleolus, bi-malleolar. These may occur either by abduction or adduction.

Fig. 4. Fracture and displacement internal malleolus. Fracture fibula high up with triangular piece, its apex directed toward the tibia. Displacement outward of astragalus. Typical abduction fracture.

tures. The French, in speaking of Dupuytren's fracture, seem to mean the same lesion that the English do in speaking of Pott's fracture.

After Pott and Dupuytren came Sir Astley Cooper, who, in 1822, described accurately practically all lesions in fracture of the ankle. Scarcely a new one has been found with the advent of the *x*-ray. Then came Maisonneuve who, in 1840, called attention to the importance of the inferior tibio-fibular ligaments in the mechanism of ankle fractures and who first recognized the frequency of the most common and most typical fracture of the ankle, the oblique fracture of the fibula at its lower end. He found this lesion was produced by external rotation and there was usually no ligamentous injury. If the force continued further, however, the internal lateral ligament would rupture and often the internal malleolus would be pulled off. The force continuing, would rupture the inferior tibio-fibular ligaments, causing a separation of the tibia and fibula and fracture of the fibula above this joint, usually two to three inches from the tip of the internal malleolus but sometimes in the upper end and middle third. This fracture of the fibula high up was called Maisonneuve's fracture. In 1872 Tilleaux called attention to a rare result of abduction and external rotation which consisted of a supramalleolar fracture of the tibia, the fibula breaking below the tibio-fibular joint usually, but sometimes above. In 1877 Honingschmeid made 125 experiments on the cadaver to determine the mechanism of ankle joint fractures. In 1892 Stimson made a distinction between fractures produced by abduction and those by external rotation. This brings us up to the time of the first use of *x*-rays. Since then many important papers have been published by able and distinguished men on this subject. Perhaps the most outstanding monograph is that of Ashhurst, published in 1922. So much for the historical side of the subject.

As Mr. Harry Platt says, "The subject of ankle fractures is shown to be an old chapter in the history of surgery and, though a commonplace problem in surgical handicraft, is classical in its antiquity and appears strangely new as each succeeding generation comes fresh to its difficulties, often oblivious of the wealth of knowledge already bequeathed by the older writers."

Some knowledge of the anatomy of the ankle joint is essential to the proper understanding of ankle joint fractures. The ankle joint is a hinge but not absolutely so, as there is some lateral movement, but the main movement is antero-posterior. It is formed above by the tibio-fibular mortise and below by the trochlear surface of the astragalus, which fits into the mortise like a wedge. It is one-fourth wider in front than behind. The projections of the tibia and fibula beyond the level of the tibial roof form the internal and external malleoli respectively. The malleoli

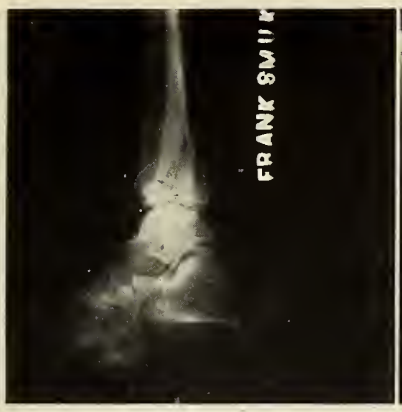

Fig. 5. Oblique fracture of fibula with posterior marginal fracture of tibia, so-called Cotton's fracture.

Fig. 6. Abduction fracture with separation of tibial epiphysis and fracture fibula higher up with displacement outward in young person.

Fig. 7. Abduction fracture of fibula. Internal malleolus represented by supra-condylar fracture of tibia instead of epiphyseal separation in a young person, as in Figure 6.

form the sides of the mortise. There is a projection on the posterior side of the tibia sometimes called the posterior malleolus. There is a groove on the external lower surface of the tibia formed by the anterior and posterior tubercles into which the fibula fits very snugly. At this point the anterior and posterior inferior tibio-fibular ligaments and felt-like interosseous membrane bind the two bones together most securely. There is a very slight range of motion between the tibia and fibula at this point. The malleoli serve to keep the foot well placed under the leg bones. The astragalus acts as a ball bearing joint and has no muscles attached to it. The ligaments of the ankle joint holding the foot attached to the leg bones are the anterior, posterior, internal lateral, and external lateral ligaments. The lateral ligaments are developed more strongly and hold the joint nearly to a true hinge, permitting only a little lateral movement, the principal movement being antero-posterior. The internal lateral ligament is fan-shaped, passing from the internal malleolus anteriorly to the scaphoid and the os calcis, and posteriorly to the median tubercle on the posterior surface of the astragalus. The external lateral ligament has three distinct bands passing from the external malleolus, one going forward to the lateral border of the neck of the astragalus, the middle passing down to the os calcis, and the posterior passing to the lateral tubercle on the posterior surface of the astragalus. The posterior band is a very important factor in the mechanism of ankle fractures. It is so strong that it seldom ruptures, and the fibula and astragalus are seldom, if ever, separated in ankle fractures; thus, if the fibula fractures, the fibular fragment and astragalus are carried along together in any displacement. In backward displacement of the foot, the fibula and tibia must either be separated or the astragalus and fibula must be separated. As it is claimed the latter event does not occur in ankle fractures, therefore, in practically all posterior dislocations, as well as lateral, there must be a separation of the tibia and fibula, which means a rupture of the tibio-fibular ligaments. Remembering that the astragalus and fibula do not separate because of this strong attachment, serves as a key to the understanding of ankle fractures. The ankle joint has an approximate movement of about 80 degrees, of which 20 degrees are dorsiflexion and 60 degrees extension, or plantar flexion.

Having thus briefly considered the anatomy and physiology of the ankle joint we will now consider the subject of classification of ankle joint fractures. Fracture of the ankle joint includes two groups. The first group includes fractures of the leg bones at the lower end of the tibia and fibula. The second group consists of fractures of the astragalus, which are relatively rare and will not be considered in this discussion. There are several classifications of ankle joint fractures. First, the historical, in which the name of some great surgeon is used, as Pott, Dupuytren, etc. This classification is not entirely satisfactory and doubtless leads to confusion. It is, however, a fine sentiment which

Fig. 8. Oblique fracture of fibula, lower fragment displaced with astragalus. Posterior and outward dislocation small posterior marginal fragment of tibia.

Fig. 9. Fracture of fibula, high. Fracture internal malleolus, comminuted. Fracture anterior tubercle of tibia. Comminuted fracture tibia above, compounded; outward displacement.

Fig. 10. Fracture of fibula. Fracture internal malleolus represented by whole lower end of tibia, displacement outward en masse.

prompts us to use the names of these great surgeons in connection with these fractures and it will doubtless be continued.

The second classification, according to mechanism, is very interesting as a study and doubtless is quite satisfactory. It is difficult, however, to classify every fracture according to mechanism, as one cannot always get a clear history as to just how the accident happened, and, while the *x*-ray picture will usually show plainly what mechanism has produced the lesion, there will occur pictures in which there will be doubt and the classification will vary according to the interpretation of the individuals examining the plates. As a basis for treatment, classification by mechanism should be valuable. In considering mechanism, we find fractures of the ankle are produced by both direct and indirect violence. Since direct violence constitutes such a small per cent (only 1 per cent according to Ashhurst), classification of ankle joint fractures according to mechanism is based almost entirely on the forms of indirect force or violence to which the ankle is subjected, acting through the astragalus in such a way as to produce a breaking strain.

There are three great types of indirect force constituting the cause of 90 to 95 per cent of ankle fractures. These three forces are: (1) external rotation; (2) abduction or eversion; (3) adduction or inversion; and to these, (4) an upward compression thrust on the ankle mortise.

External Rotation.—Maisonneuve was the first to call attention to external rotation. In this movement the foot is turned or rotated outward on the ankle with the leg bones as a vertical axis, and the strain, which is a torsion or twisting, is felt by the fibula and a spiral or oblique fracture is produced. The fracture is always higher on the posterior surface of the fibula than on the anterior. The obliquity varies and the lower end usually enters the external malleolus. In practically all these fractures the tibio-fibular ligaments are not ruptured and there is no separation of the tibia and fibula. If the violence continues, the internal lateral ligaments may be torn or the internal malleolus pulled off. In some cases the avulsing force is so great as to fracture the whole lower end of the tibia, or cause epiphyseal separation in children.

Abduction.—The second force to be considered, or the next most frequent cause of fracture of the ankle, is that of abduction. In the abduction force the astragalus tends to rotate outward in the mortise and exerts a bending strain on the fibula and great torsion on the internal lateral ligament. It is considered that this is certainly a different mechanism from external rotation because whereas in external rotation the first, and often only, lesion is an oblique fracture of the fibula, in straight abduction the first lesion is either a fracture of the internal malleolus or a rupture of the internal lateral ligament. This has been proven in experiments by Honigschmeid and others. The force continuing, a

Fig. 11. Fracture of fibula, mixed oblique. Fracture internal malleolus, dislocation of astragalus and foot en masse outward and backward. Lower fragment of fibula carried backward with astragalus. Posterior marginal fragment of tibia carried backward.

Fig. 12. Fracture internal malleolus. Fracture of fibula just above joint, and high up. An unusual fracture occurring only once in our series. Quite similar to the so-called Maisonneuve's fracture.

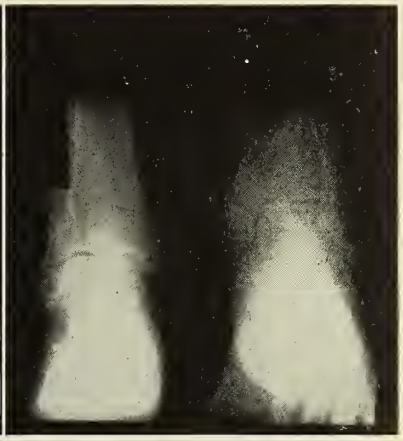

Fig. 13. Fracture of fibula above joint. Fracture external portion of articular surface of tibia. Unusual fracture occurring only once in our series.

crushing fracture of the external malleolus below the tibio-fibular ligament is produced—the bi-malleolar fracture by abduction. It is interesting to note the influence of the tibio-fibular ligaments in fracture by abduction. If these ligaments do not rupture, the fracture of the fibula is below the tibio-fibular joint, but if the ligaments tear, thereby allowing separation of the tibia and fibula, a fracture of the bending type occurs, usually in its weakest point, the surgical neck above the lower tibio-fibular joint. The *x*-ray pictures show the separation of the tibia and fibula and a flexion or inward bend of the fibula. The fracture of the fibula, being of the bending type, follows the law of Messerer; thus it breaks rarely transversely, a little more frequently slightly obliquely, and nearly always is comminuted in a typical manner, as illustrated by Messerer, with a wedge of bone from the concavity of the bend, the apex being directed toward the tibia. In fracture by abduction, as in external rotation, a separation of the whole lower end of the tibia may result, but the fibula fracture is of the bending type and not the torsion or spiral type. In some fractures it may be very difficult to say whether they are produced by external rotation or abduction. A combination of both forces is probably present.

Adduction or Inversion.—The third most prominent mechanism is that of adduction or inversion. The first lesion to occur is fracture of the external malleolus, usually at or below the level of the tibial roof, followed, if the force is continued, by a compression fracture of the internal malleolus from the inward thrust, both malleoli being fractured. It is called bi-malleolar fracture by adduction or inversion in contradistinction to bi-malleolar fracture produced by abduction. These fractures are also called "reverse Pott's." There may also occur a splitting fracture of the tibial shaft due to the weight of the body, forcing the tibia heavily on the displaced astragalus.

Upward Compression.—While the great majority of fractures of the ankle joint are caused by these three forces, external rotation, abduction and adduction, there is still another force to be considered, that of compression, or the effect of the body weight thrown on the injured limb at the time of injury, usually from falls from a height. Its general effect is to increase the separation and displacement from the previous mentioned forces. It also produces the so-called "Cotton's fracture" or posterior marginal fracture of the tibia. Cotton called attention to this fracture several years ago, although it seems to have been known by several of the older writers, including Cooper and Dupuytren. It sometimes occurs as an isolated lesion but usually is associated with fracture of the fibula by external rotation or abduction with gross displacement of the astragalus. It consists of a triangular fragment extending down into the ankle joint in the neighborhood of the tibio-fibular joint. The fragment usually remains attached to the external malleolus by the posterior inferior

Fig. 14. Comminuted fracture of fibula above joint, bending type. Spiral fracture tibia above joint, compounded; operation.

Fig. 15. Same case as in Figure 14 after replacement by internal splints. Lane plate and external splint, plaster cast.

Fig. 16. Internal sole of shoe raised and Jones' external iron with T-strap around ankle for support. Abduction or external rotation fracture.

tibio-fibular ligament and is often displaced backward with the external malleolus and astragalus.

It is interesting to note the percentage of incidence in these forms of indirect violence. Probably the most careful and authoritative study has been made by Ashhurst. He studied 300 cases and found that external rotation produced 61, abduction 21, and adduction 13 per cent. These forces caused 95 per cent of all ankle joint fractures. Platt, in a study of 116 cases, found about the same relative incidence. In connection with our fracture work at the Shipman Hospital, I have carefully re-examined the *x*-ray pictures of the last 688 fractures, taking them as they came. These fractures occurred largely in the iron mining industry. There were 115 ankle joint fractures in this series, not including fractures of the astragalus, or about 16 per cent. Kellogg Speed, in reviewing 1,316 fractures at Cook County Hospital, found 208 ankle joint fractures, or about 15 per cent. It will thus be seen that ankle joint fractures are rather frequent and of great importance economically because most of them occur in laboring men at the most active period of their lives.

In classifying these fractures as carefully as possible, following Ashhurst's tables, I found 42 per cent due to external rotation, 35 per cent due to abduction, and 14 per cent adduction, or a total of 91 per cent caused by these three forces.

Following is the grouping of our 115 cases following Ashhurst's table of classification by mechanism, as nearly as I could:

A—Fractures by External Rotation

1—First Degree:
Lower end fibula only (mixed oblique) 39

2—Seeond Degree:
Same, plus rupture of internal lateral ligament or fracture of internal malleolus ("low Dupuytren") 9
(a) Rupture, Internal Ligament 4
(b) Fraeture, Internal Malleolus 5

3—Third Degree:
Same, plus fraeture of whole lower end of tibia, representing the internal malleolus 0

Total Fraetures by External Rotation 48

B—Fractures of Abduction (Fibular Flexion)

1—First Degree:
Internal malleolus only 19

2—Second Degree:
Same, plus fracture of fibula (transverse, above or below tibio-fibular joint) 19
(a) Complieated by posterior marginal fragment of tibia 5

3—Third Degree:
Internal malleolus represented by whole lower end of tibia 3

Total Fractures by Abduction 41

C—Fraetures by Adduction (Tibial Flexion)

1—First Degree:
External malleolus only, transverse at or below level of tibial plafond 8

2—Second Degree:
Same, plus
a—Internal malleolus below level of

tibial plafond ("bi-malleolar fracture") 8
b—Median surface of tibia up and in from joint surface 0
3—Third Degree:
Same, plus whole lower end of tibia ("supra-malleolar fracture by adduction") 0
Total fractures by adduction 16
D—Fractures by Compression in Long Axis of Leg
1—Isolated marginal fractures 0
2—Comminution of tibial plafond and fractured fibula 1
3—T- or Y-fractures ("V-fractures of Gosselin") 0
Total Fractures by Compression 1
E—Fractures by Direct Violence (supra-malleolar types) 6 6
F—Fractured Fibula alone, Direct Violence 3 3
115

Finally, in the matter of classification, perhaps the simplest and best of all classifications is that based on anatomical groupings. Ashhurst, while seeming to favor the classification according to the mechanism, also groups his 300 cases under an anatomic classification.

Following are our 115 cases grouped according to Ashhurst's anatomic table:

A—Fibula, Below Inferior Tibio-fibular Joint
1—Alone (slight or no displacement, often subperiosteal) 19
2—Same, plus internal malleolus below tibial plafond (includes bi-malleolar fractures by adduction and by abduction) 9
3—Same, plus split of tibia up and in 1
Total Fractures, Fibula Below Inferior Tibio-fibular Joint 29
B—Fibula, Obliquely Through Inferior Tibio-fibular Joint
1—Alone (slight or no displacement, often subperiosteal) 28
2—Same, plus rupture of internal lateral ligament 0
3—Same, plus fracture of internal malleolus 6
4—Same, plus fracture os calcis 1
Total Fractures, Fibula Obliquely Through Inferior Tibio-fibular Joint 35
C—Fibula, Above Inferior Tibio-fibular Joint
1—Alone (slight or no displacement, often subperiosteal) 3
2—Same, plus rupture of internal lateral ligament and diastasis 4
3—Same, plus fracture of internal malleolus and diastasis 18
4—Same, plus fracture outer aspect tibial plafond 1
Total Fractures, Fibula Above Inferior Tibio-fibular Joint 26
D—Tibia, Involving Ankle Joint
1—Internal malleolus alone (slight or no displacement, often subperiosteal) 19
2—Isolated marginal fractures 0
3—Comminuted, T- and Y-fractures 0
Total Fractures, Tibia Involving Ankle Joint 19
E—Supra-malleolar Fractures, Not Involving Ankle Joint Directly (Probably Direct Violence) 6 6
115

Platt, who has recently written a most excellent and authoritative paper on ankle fractures, favors the anatomical classification as being the simplest, the most understandable, and best one for keeping records. Dickson, who read a paper on ankle fractures at the last meeing of the American Medical Association, uses and prefers an anatomical classification. Following is his classification which he says is essentially Platt's:

A—Fractures of the Malleoli
1—Isolated
a—Fibula
b—Internal malleolus
2—Combined
a—Low bi-malleolar without displacement of astragalus
b—Bi-malleolar with displacement of the astragalus (Pott's-Dupuytren fractures)
B—Fractures of the Weight Bearing Surfaces of the Tibia
1—Isolated
a—Posterior marginal fractures
b—Anterior marginal fractures
2—Combined
a—Anterior or posterior marginal fractures associated with fractures of the malleoli

Diagnosis and Clinical Consideration.—In all injuries about the ankle joint in which there is a history of forcible movement of the foot, a fracture should be suspected. Usually the injury is so severe that the patient cannot walk. The foot is usually held in plantar flexion and everted in varying degrees, the internal malleolus being prominent. In the severe cases there are abnormal mobility, especially in the lateral direction of the joint, points of tenderness around the ankle and often great swelling. It hardly seems necessary to detail all the clinical signs in the diagnosis of a fracture with which all physicians are quite familiar. Suffice to say that in all ankle injuries a full radiographic examination should be made, especially when there is an indirect forced type of movement such as external rotation, abduction, or adduction. While the more serious types of ankle joint fractures are plainly evident without *x*-ray, there are many ankle

joint fractures in which it is very difficult to determine whether or not a fracture is present. The *x*-ray picture will always clear up the diagnosis besides showing plainly just what lesions have been produced. Both antero-posterior and lateral *x*-rays should be taken, as the simple oblique fracture of the fibula may not show with an antero-posterior view but will always show in a lateral, and a fracture of an internal malleolus may not show in the lateral but will always show in the antero-posterior view. The *x*-ray also shows the varying degrees of displacement of the astragalus in its relation to the tibia. Sometimes these displacements are very slight but they should be considered in the treatment, as perfect reduction of the astragalus in relation to the tibia is very necessary for good recovery of function.

The treatment of ankle fractures naturally resolves itself into two groups, treatment of the recent fracture and treatment of the old fracture in which a poor result has been obtained. Each one of these old fractures constitutes a problem in itself and this group will not be considered in this discussion.

Dupuytren said, "Under the most favorable circumstances they, that is, fractures of the lower end of the fibula or of the ankle, almost always leave deformity and lameness which renders progression more or less painful and difficult," but he seems to have treated his own cases very well for he reports 202 out of 207 ankle joint fractures as cured, and of these in two only was there deformity and in one only loss of mobility. He had five deaths in these series, but as these were compound fractures occurring before the time of Lister, we can easily account for the deaths from sepsis. It is very evident that Dupuytren taught and perfected efficient methods of treatment. Murphy once said in his Clinics, "Failure to secure a good result from treatment occurs more commonly in connection with Pott's fracture than with any other type except a Colles' —Colles' fractures more frequently result in a failure to restore normal conformation but one not nearly so detrimental to the comfort and service of the patient as in the case with a Pott's fracture with poor conformation." Speed says these fractures do result in some permanent impairment of function even when treated by the best of methods devised to date. Dent, speaking of these fractures, said that most of the London police who sustained a Pott's or Dupuytren's fracture were unable to resume their duties on the police force. A deformed painful ankle and obstinate flat foot are too often the bad results of these fractures.

These words, from such masters, should stimulate us to do our very best in the treatment of these fractures in order to prevent the bad results of which they speak and with which they must have frequently come in contact and, as these fractures constitute about one-sixth of all fractures and occur mostly in laboring men of the industries at the most active period of their lives, poor results bring a great economic loss.

The question of conservative or operative treatment comes up for consideration in fractures of the ankle, as it does in the treatment of all other fractures. The general consensus of opinion gathered from the literature seems to favor conservative treatment in practically all cases except those specially selected cases where satisfactory apposition and maintenance of the apposition cannot be achieved by the usual splints or plaster. Such specially selected cases should, no doubt, be treated by operation. In this connection, however, it is well to note the remarks of Ollerenshaw, who said that, while good reduction of the deformity is essential, it is not necessary to secure the most absolute precision in order to get complete return of function. The best results seem to be obtained by the conservative treatment, reserving special cases for operation. Even in England, the home of the teaching of the Sir Arbuthnot Lane School of operative treatment of fractures, acceptance of this teaching, so far as ankle joint fractures are concerned, has not met with ready acceptance. In this connection it is interesting to consider the following, quoted from Mr. Harry Platt:

"When I began to take an intensive interest in this subject some three years ago, stimulated particularly by Ashhurst's unique paper, my general impression was that the routine use of non-operative methods was attended by far too many disappointments. At that time I felt tolerably certain that sooner or later I should be persuaded to give a systematic trial to reduction and fixation by open operation. This attitude was chiefly determined by the fact that the majority of the patients with recent ankle joint fractures dealt with in my clinic were discharged from physiotherapeutic treatment somewhere between the eighth week and sixth month, according to the type of case. At this stage most of them were considered fit to undertake light work. In many cases the records made at the time of discharge emphasized the existence of a slight

limp, necessitating the use of a stick, and many ankle joints which showed a satisfactory anatomical result were not entirely free from discomfort, and sometimes showed limitation of mobility. But my earlier impressions have been considerably modified by the information obtained from a survey of the late results, for it has been the rule to find that steady improvement has occurred from the sixth month onwards. I have been able to trace about 90 per cent of the cases, and to estimate the type of functional result, either from a personal examination or from the answers given in a questionnaire. The most striking results are seen in the patients reviewed after a period of two years or more has elapsed from the time of the injury, the great majority of whom have been able to return to pre-accident occupations involving laborious duties; no patient in this series is prevented from working as a result of his injury.

"I am confident that in the greater proportion (if not all) of ankle joint fractures accompanied by displacement even of the most extreme degree, it is possible, by non-operative methods, to achieve perfect anatomical reposition, and insure the highest standard of functional result. Similar views have been emphasized recently by Ferry of the Strasbourg University Surgical Clinic."

In our own series we have followed the conservative treatment, reserving operation for only a selected few. So far as I know, all of these patients in this series have been able to resume their regular work and perform the same duties they did previous to the accident. It is our practice to *x*-ray immediately all injuries to the ankle, taking a lateral and antero-posterior picture, often on the same film, to determine first whether a fracture is really present and, second, to determine just what type of fracture we have to deal with, what bones are fractured, the extent of displacement, and especially the relation of the tibia and astragalus to each other at their articular surfaces, as it is very important to recognize all grades of dislocations of the astragalus from the tibia so that it may be reduced, as it is very necessary that the astragalus and tibia be in normal relationship and with good alignment for future function in weight bearing.

Having determined by clinical examination and *x*-ray pictures just what lesions we have to deal with, we almost invariably put the patient to sleep at once and reduce the fracture. We feel more and more, in our experience with fractures, that the quicker the reduction is accomplished, under anesthesia in nearly all instances, the easier will be the reduction, the less the pain and discomfort to the patient and the more satisfactory the result. We do not recall a case in which the swelling or disloction of the ankle was too great to prevent immediate interference and reduction. Immediately after reduction, it is our practice to apply a plaster cast from the toes to just below the knee, first being sure that the leg is well bandaged and padded, especially over the bony prominences and overt he head of the fibula to protect the external popliteal nerve as it winds around the neck of the fibula. In the fractures due to external rotation and abduction in which the foot turns out, the foot is put up in a strongly inverted position and dorsiflexed to a right angle to the tibia, being sure that the heel is inverted as well as the anterior part of the foot. If the fracture is bi-malleolar on a level with the tibial roof and, due to adduction, the so-called reverse Pott's, and also bi-malleolar from abduction, the foot must not be put up in a strongly inverted position, as the upper end of the lower fragment of the fibula is then apt to be pulled too far in and left under the tibia, the result being that the patient eventually comes to walk on his exernal malleolus. These fractures are rather difficult to get in proper position so that both malleoli unite perfectly. Accurate replacement of the malleoli with the foot dorsiflexed to a right angle without lateral or medial deviation, or in a very slight adduction, should be the rule. Murphy favored nailing the malleoli. Speed says in these bi-malleolar fractures at the same level the malleolus can sometimes be reduced through manipulation and a plaster cast applied, but many cases require nailing to hold both sides in position. When a malleolar fracture is complicated by rupture of the interosseous ligament and separation of the lower ends of the two bones, with a possible forcing up of the astragalus between them, nothing short of open operation to press the bones together, to return the astragalus to its proper articular position, and to nail on the two malleoli and the tibia to the fibula will preserve good function and prevent the widened painful ankle. Coton says, "The inverted Pott's or reversed Pott's or inward luxation bi-malleolar fracture is often mistaken for the real Pott's or eversion fracture, and if there were no *x*-rays and no rules for the treament of Pott's fracture, these inverted Pott's fractures would fare no worse, I fear, as the well schooled interne is apt to put them up in inversion." As before mentioned, one must, in all these ankle fractures, be careful to get the astragalus squar-

ly under the tibia in good alignment for future weigh bearing. The cast, having been applied, may be bi-valved at once or at the end of two or three weeks. We have done it both ways. It is probably safer to bi-valve it at once but we have never experienced any difficulty in those that have been left on for three weeks. We have also used the Stimson lateral and posterior plaster splints with considerable satisfaction. Scudder seems to favor these splints. Speed also favors them but has modified the Stimson splint by using one splint only, consisting of an external lateral which winds around the foot. The foot is usually retained in the inverted position or whatever position it has been put up in, in the plaster splints, or cast, for a period of six weeks, then the splints may be removed and daily hot water baths and oil massage given and active and passive movements, and the splint, at least the posterior half, reapplied. It is very important to maintain the position of the properly reduced fracture of the ankle for a sufficiently long period to secure good firm union of the fragments and, more important perhaps, to give torn tibio-fibular and interosseous and other ligaments abundant time to unite firmly and solidly, for if weight bearing is borne too soon, an otherwise perfect reduction and position and result may be destroyed by the callus giving way and the ligaments stretching, allowing the foot to be pronated and the ankle widened, thus producing a painful, deformed ankle and flattened foot, with great disability of the ankle joint. Jones said, "The crux of the matter lies not in the fracture of the fibula, but in the outward and backward dislocation of the foot. However, every surgeon, in reducing such a fracture, endeavors to invert the ankle, but comparatively few take any measures to maintain inversion of the foot after the patient begins to walk." Weight bearing should not be begun short of six weeks and a longer period is usually necessary, especially in the severe fractures. Usually it must be begun lightly and gradually increased without pain, discarding one crutch and then finally both crutches. The patient should wear a strong, well supported pair of shoes and often they should be raised on inner soles and heel to keep the foot from everting, so the patient will walk on the outside of his foot instead of on the inside. Sometimes it is necessary, in addition to this, to provide the Jones outside iron brace with inside T-strap to give proper support and keep the foot inverted. Wedging of the inner side of the shoe is an old practice used by Amrose Pare. Where there is unusual persistence of edema, radiant heat and diathermy have been used. We have had no experience with diathermy.

There is no doubt but that there is a great impetus in the profession at the present time to improve in the treatment of all classes of injuries that occur in industry and this includes all fractures. Any one who has attended a meeting of the American Medical Association and watched the keen interest and large attendance upon the fracture committee's demonstrations, cannot but be impressed with this fact. It is sincerely to be hoped that the American Medical Association will continue these fracture demonstration booths, which cannot but result in great improvement and better understanding in the handling of fractures.

A new specialist, the industrial surgeon, seems to be evolving and, as Mr. Harry Platt said, "Let us confidently hope that the century-old dictum of Dupuytren will lose its sting," so that, in speaking of ankle joint fractures, it may never be said, "Under the most favorable circumstances they almost always leave a deformity and lameness which renders progression difficult and painful."

PROS AND CONTRAS IN THE USE OF IODINE FOR THE TREATMENT OF GOITER*

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A BETTER understanding of the iodine treatment in goiter necessitates a study of what has been done in previous years. You may, therefore, permit me to refer to an article most complete in the history of iodine treatment, written by Prof. F. de Quervain of Bern, Switzerland. I shall only touch upon the salient points as brought out in his paper.

We learn that iodine was used, though unknowingly, by the Chinese over 3,000 years ago for the treatment of goiter. The Greeks in Hippocrates time made use of the ashes of the sea sponge for goiter. The same we know of the school of Salerno, 1200 A. D. They also used sea sponges and sea weeds which today we know contain iodine.

Iodine as a chemical element was discovered in 1812 by Courtois of Dijon. It was Coindet, a physician of Geneva, in 1920, who then used iodine and introduced it as a remedy for goiter.

In the year 1849 Prevost brought out the thought that the lack of iodine in drinking water possibly was an etiological factor in the genesis of goiter. This thought led the French chemist Chatin to examine various foodstuffs in different parts of the country and he found the iodine content varied considerably.

This view of Chatin, though there was a great deal of opposition, laid the foundation for a prophylatic treatment. France then established in three different provinces iodine treatment for goiter. The school children received one centigram (0.01) potassium iodide daily in tablet or in liquid form.

There then originated the idea proposed by Boussingault of adding iodine to the kitchen salt. He suggested 1-5 decigrams of potassium iodide (KI) to two pounds of salt, this as a more radical treatment for well established goiter cases. In 1855 Austria followed this movement of France in goiter prophylaxis and Italy a few years later took up prophylatic treatment for cretinism.

Already at that time unfavorable reports of iodine treatment were heard. Rilliet in 1860 came out with a paper entitled "Iodism Constitutionel" in the Academy of Medicine, Paris. The war on iodine was then on. Its use was practically discontinued due to a weighty paper by Kocher on "Iodbasedow" read before the German Congress of Surgeons.

"Iodbasedow," as he determined it, is a toxic condition. Such a patient looks emaciated, has tremor combined with nervousness, is excited and anxious. This "Iodbasedow" is clinically characterized by a rapid decrease of the goitrous tumor itself. Such rapid decrease of goiter has been explained by men like Virchow as an absorption of the thyroid substance.

Many physiological facts have by now come out about the thyroid gland. Baumann in 1895 made the epoch-making discovery that every normal thyroid gland contains iodine. It is rather surprising, therefore, that the iodine treatment which had been used empirically for thousands of years should have been disregarded, even after Kendall in 1914 had isolated in crystalline form this hormone containing iodine which he called "thyroxin."

We know today that the content of iodine in a normal human thyroid gland amounts to only 25 mgs. Marine's and Lenhart's experiments on dogs showed that 1 mg. of iodine prevented goiter in these animals, though they were living under conditions which otherwise produced thyroid enlargement. Boothby and Sandiford found that 1 mg. of thyroxin was sufficient to exert its effect on the metabolic rate in man for as long as seventy days. All these facts bring out the importance of the use of small dosage of iodine in the treatment of goiter.

Marine, as a leader in this question, has proven that 2 grams of sodium iodide administered over a period of two weeks twice yearly was fully sufficient as a prophylatic treatment, and, of 1,182 goiters, 773 showed reduction. In Switzerland it has been found that even smaller doses, 1 or

*Read before the Staff of the Northwestern Hospital, Minneapolis, Minn., Jan. 16, 1928.

2 mgs. a week, were considered sufficient (Hunziker).

This is the basis upon which any prophylaxis must be instituted. Under what form this prophylaxis would have to be established is a matter which has to be figured out by the men who may be entrusted with this most difficult task, a goiter prophylaxis in a large country like ours.

TREATMENT

Every goiter case must have a history, physical examination, and accurate data obtained about the size of the gland and its vascularization; a laryngoscopic picture so as to be sure not to overlook paretic vocal cords (thus avoiding legal prosecution), and an accurate rating of the metabolism should be included. In this way we can group the cases. A simple classification is important.

We divide the goiters into two groups: the one (as we believe we know now) based upon iodine insufficiency; the other, the toxic adenoma and the true exophthalmic goiter.

The first group, due to iodine insufficiency, includes the simple goiter, myxedema and cretinism. Physiologically such goiter is but a compensatory increase of thyroid gland, considered today due to iodine insufficiency. In children and in adolescents we know that the body tolerates iodine considerably better than in adults. When puberty comes on, the products of the thyroid gland are more called upon. The same again we find in pregnancy. The menopause is a critical time, more susceptible to iodine toxicity.

In this first group of goiters due to iodine insufficiency we are in the habit of using "Iodostarine" (Hoffman La Roche Co., Switzerland), which comes in tablet form in one centigram doses (0.01). We prescribe these tablets to be taken from one to three times a week, according to the case. They should be given for a number of weeks under careful control.

There are cases treated with iodine where the goiter distinctly increases in size and becomes harder. These goiters today are known as "iodine goiters."

We have generally had better results following the dispensing of desiccated gland in one to three grain doses given mostly three times a day. We have seen more reduction of the goiter by this remedy than by the use of iodine. I was pleased to see that men like Marine have made the same observation. If there are no untoward effects like nervousness and increased pulse we continue the treatment of one to three grains of desiccated gland three times a day for one or more months, alternating with the mentioned amount of iodine.

The effect of iodine upon the body weight in simple goiter and in myxedema must not be confused. If there is loss of weight in simple goiter cases by giving either iodine or desiccated gland, then we must interrupt the treatment. In myxedema we are looking for decrease in weight, which means a decrease of the superfluous deposit of mucin in the body. We have had cases of myxedema that lost twenty pounds of body weight when the metabolic rate became normal.

We are unable to promise a patient with full-grown goiter a cure by medicine, especially if there are anatomical signs of degeneration within the growth like cysts, hemorrhages and calcareous deposits. Therefore, most such goiters become surgical, their operative mortality having become exceedingly low in experienced hands.

EXOPHTHALMIC GOITER

The etiology of exophthalmic goiter is not known as yet. Men like Charcot, Trousseau, and others were of the opinion that Graves' disease is not a disease of the thyroid gland primarily, but has its origin in the visceral nervous system. The hypothesis of Moebius that the thyroid section in Graves' disease is an abnormal product, toxic to the body, a theory recently taken up again by Plummer, has been opposed by Marine. He fed as much as 11 grams Graves' disease thyroid to severe cases of hyperthyroidism without any change in their clinical condition, while a decigram of the standard desiccated thyroid produced a very marked reaction. He says that "this is just the opposite of what should occur if the severe case associated with marked hyperplasias were producing a more toxic secretion and we considered this experiment as additional proof that the thyroid in Graves' disease was not different from the thyroid of similar morphological and chemical constitution of other clinical associations."

Supposing now that the diagnosis of exophthalmic goiter is made, that we have before us a typical hyperplasia with exophthalmus and all the other symptoms belonging to Graves' disease or may it be only a toxic adenoma which has

become grouped under hyperthyroidism on account of the general symptoms, tachycardia, goiter, possibly without exophthalmus. What is its treatment now and what was it formerly?

At Kocher's time, when I was his assistant, there was no specific treatment for exophthalmic goiter. The patient was hospitalized and the bed rest with some diet had always a surprisingly good effect. There was no medication. Kocher's view of iodine which I have previously brought out in describing what he termed the "Iodbasedow" excluded this drug. Still it was Baumann and later on Kocher himself who found a decreased amount of iodine in the glands of Graves' disease; rather surprising that this thought had not been followed up.

In 1920 E. Neisser published favorable, at times sudden and even miraculous results following iodine medication in small amounts in Graves' disease. He used five drops of a 5 per cent KI solution three times a day, increasing to 30 drops three times a day.

A. Loewey and H. Zondek confirmed these good results in twelve further cases and others again were unable to confirm Neisser's success.

For all those years we were struggling in the dark. Our point of aggression was the gland itself. We tried to bring down the circulation gradually so as to reduce the amount of poison given up to the body by the thyroid gland. We ligated one horn, then another horn, sometimes three and four major arteries. It is true that we had often had remarkable results, at times almost sudden improvement within twenty-four hours or within a few days. In fact we had patients who remained well for more than twenty years after both upper poles were ligated. We explained our good results following ligation by the fact that the non-absorbable suturing material (silk or linen) were used besides catgut and also because we not only tied the superior thyroid artery alone, with or without the veins, but we took in the whole tip of the upper horn. By doing so we included the posterior branch of the upper thyroid artery, a fact easily overlooked.

The good results following our ligation operations often made us decide not to do more surgery; however, as in a great percentage of these cases of hyperthyroidism the condition recurred we became convinced that we fell short with our conservation methods.

Today we have landed on safer ground. The preoperative treatment with Lugol's solution introduced by Plummer a few years ago has given us a wonderful aid. It is to his credit that the mortality of the radical treatment of exophthalmic goiter has come down to such a surprisingly low rate.

Lugol's solution is given to the hospitalized patient suffering from exophthalmic goiter in five drop doses t.i.d., increasing two or three drops daily until the patient receives ten drops three times a day or from ten to twenty drops three times a day. We consider it essential to give this drug following the meals in two to three ounces of cream. It is striking that such a drug is so well tolerated by frail, young or old, individuals.

In typical exophthalmic goiter the severe nervousness, the gastro-intestinal symptoms, the tachycardia, the erythematous condition of the skin and so on, less the exophthalmus, improve together with an increase of the body weight within five to ten days to such a degree that the patient presents a good surgical risk. The drug has to be continued on the day of the operation and following the operation in order to overcome, or anyway diminish, the post-operative storm. The operation should take place when the remission has reached its height. It is very often beneficial to go on for a month or two following the operation with smaller doses of the drug.

The metabolic rate is our laboratory control. We repeat the statement that every goiter case has to have a metabolism test at the start and in hyperthyroidism this test is repeated at a later date previous to operation. If the decrease of the metabolic rate goes hand in hand with the clinical improvement, then the prognosis for surgery is good.

This improvement is not so evident in toxic adenomata cases. Here often we find the tachycardia does not improve in spite of Lugol's and rest in bed. These are the cases where we have to think of our former years' régime, where we have to feel our way through (so to say); these are the cases where the ligation improves the condition so much that a radical excision may be tolerated.

The number of ligation operations has decreased markedly through the use of the Lugol treatment, another great advantage of this medication.

In glancing through our own material we find 170 cases where the metabolic rate has been determined. Of those, 145 were operated upon; seventy-nine belonging to the true exophthalmic class in the ages between 11 and 71; sixty-six toxic adenomatas between the years 18 and 67. In both these groups we find the disease occurring in the proportion of five women to one man. The predominant age for the exophthalmic goiter is between thirty and forty years, while most of the toxic adenomatas are within the years of forty to fifty. Without further tabulation we are unable to say how much of a percentage of improvement in the metabolic rate we had in our cases. But incidentally we will mention that in forty-eight goiter operations last year there were forty-five radical resections and three ligations without death.

Today we have no scientific explanation of the action of Lugol's solution upon Graves' disease. We will quote, though, Marine's hypothesis. He says:

"Iodine by causing a rapid accumulation of colloid in the aveolar spaces produces a pressure retention of the secretion until the cells accommodate themselves to function under the increased tension."

In reference to this I will cite a publication that appeared (Feb., 1926) in the Southern Medical Journal by Henry M. Thomas and William F. Rienhoff from Baltimore, Md. Their report is on thirty cases of Graves' disease. They excised an upper horn of such a diseased gland previous to the administration of Lugol's solution, thus demonstrating histologically a most pronounced picture of hyperplasia. Then they treated these cases with Lugol's solution. The gland was then excised and the microscopical section showed a transformation toward ordinary colloid goiter.

This same Lugol's solution not used as Plummer advocated for a preparatory treatment to surgery loses all its value after a certain time and the entire complex of symptoms of hyperthyroidism comes back. If this is not thoroughly understood the solution can be just as harmful as beneficial.

The purpose of this paper is to leave the thought that only minute doses of iodine should be used for prophylaxis and for the treatment of non-toxic goiter. Moreover massive doses of iodine as indicated by Plummer's pre-operative treatment for Graves' disease must not be used unless it be in direct conjunction with surgery.

REFERENCES

de Quervain, F.: Schilddruese und Jod mit Rueck-sicht auf die Kropfprophylaxe. Schweizerische Medizinische Wochenschrift, 1922, No. 35.

Richardson, Edward P.: The value of iodine in the surgical treatment of exophthalmic goiter. Boston Med. & Surg. Jour. 194:1066, June 10, 1926.

Richardson, E. P., and Means, J. H.: Results of surgery and of surgery combined with roentgen-ray treatment in exophthalmic goiter. Arch. of Surg., Sept., 1924, 9:237.

Starr, Paul, Walcott, H. P.: The effect of iodine in exophthalmic goiter.

Segall, H. N., and Means, J. H.: Arch. of Int. Med., Sept., 1924, 34:355.

Holmes, Maynard E.: The value and danger of iodine in thyroid disease. N. Y. State Jour. of Med., Vol. 27, No. 10, May 15, 1927.

Bram, Israel: Is the indiscriminate use of iodine becoming a menace to goiter patients? Am. Med., Feb., 1927.

Tihen, H. N.: Iodine and goiter. Jour. of the Kans. Med. Soc., Jan., 1926, 26:4.

Cole, L. B.: The use of Lugol's iodine in exophthalmic goiter. Lancet, April 16, 1927, p. 12.

Marine, David: The use and abuse of iodine in the treatment and prevention of goiter. Ann. of Clin. Med., April, 1927.

Jackson, Arnold S.: Iodine in the treatment of goiter. Journal-Lancet, March 15, 1925, p. 133.

Marine, David: Iodine in the treatment of diseases of the thyroid gland. Medicine, 6:127.

Lahey, Frank H.: The use of iodine in goiter. Boston Med. & Surg. Jour., 193:487, Sept. 10, 1925.

Thomas, Henry M., and Rienhoff, William F., Jr.: Iodine in the treatment of hyperthyroidism. South. Med. Jour., 19:2, Feb. 19—.

Plummer, Henry S. and Boothby, Walter M.: The value of iodine in exophthalmic goiter. Jour. of Iowa State Med. Soc., Feb. 1924, 14:66.

Buchanan, J. Arthur: Iodine in the treatment of hyperthyroidism. Med. Jour. & Rec., Dec. 17, 1924.

Hirschfelder, Arthur D.: A simple method for administration of iodides in the food in goitrous regions. Jour. Am. Med. Assn., Oct. 21, 1922.

Pemberton, John De J.: Modern management of exophthalmic goiter. Calif. and West. Med., Nov., 1926.

Jackson, Arnold S.: Conclusions based on a study of four thousand cases of goiter. Ann. Surg., 79:840 (June) 1924.

Bartlett, Willard: Goiter. Hygeia, Sept., 1925.

Smith, Philip S.: Some practical considerations of goiter. Virginia Med. Mont., Oct., 1924.

Rose, Edward: The importance of medical supervision in hyperthyroidism. Clinic at U. Hosp. Phil., Pa.

Plummer, William A.: Iodine in the treatment of goiter. Read before the Fourth Annual Clinic of the

Mitchell Physicians & Surgeons, Mitchell, S. D., Nov. 11-12, 1924.

Arrasmith, W. J.: Classification of goiter with special reference to iodine therapy. Nebraska State Med. Jour., 11:174 (May), 1926.

Cooke, A. B.: The use and abuse of iodine in the treatment of goiter. Southwest., Med., June, 1927.

Buchanan, J. Arthur: Iodine in the treatment of hyperthyroidism. Med. Jour. and Record. (Practical Therapeutics) 599.

Boothby, Walter M.: Iodine in the prevention and treatment of goiter. Indiana State Med. Jour., Jan., 1925, p. 5.

Starr, Paul: The course of hyperthyroidism under iodine medication. Arch. Int. Med., 39:520 (April) 1927.

Marine, David: Prevention and treatment of simple goiter. Atlantic Med. Jour.. April, 1923, p. 437.

Holmes, G. W.; Richardson, E. P., Means, J. H., Starr, M. P. and Porter, C. A.: On the treatment of exophthalmic goiter. Section of medicine, 191: 295.

LENDING AID AND COMFORT TO QUACKERY

The federal officials whose business it is to prosecute the exploiters of medical fakes and frauds have for years complained that the government is much hampered in its legal assaults on quackery by the fact that physicians of standing will sell their expert testimony to the nostrum exploiters. Regardless of the nature of the evidence or opinion, the appearance of a reputable physician on the side of the quack may lead a jury to believe that the nostrums under consideration are worth while and that the claims made for them are true. Recently hearings have been held before the Federal Trade Commission in the matter of a quack "obesity cure" known as "Marmola." It is sold by one Edward D. Hayes, who at the present time does business under the trade name "Haladam Co." He has repeatedly been prosecuted for the exploitation of quack nostrums. Marmola, according to the exploiters, has essentially the following composition: Desiccated thyroid ½ grain, extract of bladderwrack (fucus vesiculosus) 1 grain, extract of phytolacca ½ grain, extract of cascara sagrada ¼ grain, phenolphthalein ¼ grain. For the government Dr. Charles A. Elliott, Solomon Strouse and Rollin T. Woodyatt testified as to the effects of the indiscriminate use of thyroid substance by the public. Not one of these three men charged the government a cent—they donated both their time and special knowledge. At a subsequent hearing Edward D. Hayes had expert witnesses to testify that Marmola was a scientific (!) preparation and that it was harmless when used according to directions. The men that testified to this effect were: Robert W. Keeton, Alonzo C. Tenney, Frank L. Stone, George W. Funck, Harold S. Hulbert, Samuel F. Haverstock. Each of these men is a member of his local medical society and, through that, has qualified as a Fellow of the American Medical Association. Here, then, is a sweet spectacle: the American Medical Association attempting to protect the public against quack remedies, while individual members lend aid and comfort to the exploiters of quack remedies. (Jour. A. M. A., November 3, 1928, p. 1377.)

THE PRESENT STATUS OF THE PROSTATIC PUNCH OPERATION*

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UROLOGISTS have appreciated for some time not only the difficulty of dragging from its bed the atrophic adherent and sclerotic tissue of an obstructive median bar but the absurdity of performing a major operation for the removal of so small an amount of tissue. To overcome this difficulty and objection many types of instruments were devised for intra-urethral use, those of Young, Caulk, and Braasch being most generally employed.

Many such instruments have not been more generally accepted, I believe, for two reasons: the lack of adequate vision during the operation, and the incidence of postoperative hemorrhage and the difficulty of controlling it. Braasch, by adding a tubular knife to his direct cystoscope, overcame the objection of inadequate vision, and with the advancement and refinement in the application of electricity Caulk overcame to a marked degree the incidence of hemorrhage by changing the cutting blade of Young's original instrument to a cautery knife.

If patent rights would permit the combining of these two instruments I believe an absolutely bloodless operation under adequate vision would be possible and sufficient tissue could be removed to insure satisfactory results. Striving for the same end, namely, adequate vision with control of bleeding, Collings and Foley by utilizing the finer refinements of electrical development together with the marked improvement in the lens system of cystoscopes have developed instruments that promise to give adequate vision and satisfactory hemostasis.

The main objections to the punch operation being removed, it is apparent that its more universal application must follow and it seems pertinent, therefore, at this time to report the results obtained with the earlier instruments in order that we may more readily appreciate the proper field of application and the limitations of the operation. Unless such limitations are appreciated unsatisfactory results may be attributed to these new instruments or the operation may be undertaken when greater experience would have contraindicated this particular form of treatment.

Because the symptoms caused by bar formation at the vesical neck are analogous to those produced by prostatic hypertrophy, many physicians attempt to treat the condition by the same method, although, as we know, the underlying pathologic changes are entirely different, one being due to hyperplastic changes and the other to atrophic.

It is, therefore, imperative to ascertain at the start which process is responsible for the symptoms. If they are due to median lobe hypertrophy and there is only slight lateral lobe enlargement, success may be expected by the use of the punch. If the median lobe is entirely removed in the presence of equal or greater hypertrophy of the lateral lobes, the removal of the median lobe will allow the lateral lobes to approximate still closer, and instead of relieving the symptoms by removing the existing obstruction a greater degree of obstruction may take place. This fact undoubtedly explains an axiom frequently heard that the punch operation is not applicable in cases of adenomatous hypertrophy.

In the series of 168 cases, the results of which I shall report, adenomatous hypertrophy was found in the removed tissues in twenty-two cases. Only one of the patients heard from failed to report benefit; fourteen reported that they were completely cured, and the other three were improved. This confirms Keyes' remark: "It is the fibrous rather than the adenomatous obstructions that will—shall we say immediately recur or immediately not be relieved." Unless all obstructing tissue is removed relief of symptoms of obstruction can hardly be expected. This is borne out by the fact that of the ten patients in this series in whom complete prostatectomy was necessary later, nine had sufficient lateral lobe enlargement to call for comment on cystoscopic examination, emphasizing that it is the position of the obstruction, not the type, that determines the success or failure of a punch operation.

*From the Section on Urology, Mayo Clinic, Rochester, Minnesota. Read before the North Central Branch of the American Urological Association, Columbus, Ohio, November 2 to 3, 1928.

The cicatricial changes due to chronic inflammation, of course, offer the greater percentage of cases applicable to the punch. Yet care must be exercised to be sure that such cicatricial changes have occurred, for it has been my experience that no greater mistake can be made than to try to relieve the symptoms of prostatitis associated with 25 or 50 c.c. of residual urine, or none, by removing a portion of the edematous and engorged sphincter. The symptoms are usually aggravated, the inflammation increased and the distress of the patient magnified, with the result that this particular form of treatment is forever in disrepute. It must not be overlooked that complete prostatectomy for the same condition is frequently of little avail.

However, when the inflammatory process has finally produced cicatricial changes that obstruct the vesical neck and considerable time has elapsed since the condition was acute then one may expect and does obtain gratifying results by the removal of the bar by some method of incision or excision. Unless there is obstruction, however, with associated residual urine, it has been my experience that relief of dysuria or frequency will not occur by the removal of cicatricial tissue around the neck of the bladder.

In a series of 952 prostatectomies performed at The Mayo Clinic during the last five years (prior to January, 1928) the punch operation was performed in 168 cases: a ratio of 1:6. Eighty-two of these 168 operations were performed with Caulk's cautery punch and eighty-six with Braasch's instrument. The latter permits perfect vision during the operation and it is possible to remove as much or as little tissue as desired and at the point desired without the fear of perforating the bladder by faulty application, for not only can the tissue to be removed be seen but its relationship to all adjacent tissue can be determined.

Hemorrhage has been controlled at the completion of operation by electrocoagulation of the bleeding points with a small electrode introduced into the catheterizing sheath of the direct cystoscope. This, I believe, is superior to complete cauterization of the operative field, as febrile reactions of three days or more, which were indicative of pyelonephritis following the eighty-two cautery excisions, occurred in thirty-seven cases or in nearly 50 per cent and lasted an average of eight days. Following the knife excision such reactions occurred in only twenty cases or in less than 25 per cent and lasted an average of four days, or half as long and half as frequently. The healing following excision by the knife punch was much more rapid, and there was less ascending infection.

The patient is not allowed to leave the table until all bleeding points have been controlled. This prevents the formation of clots in the bladder and the spasm that occurs with the effort to expel them, a factor which is probably responsible for continued bleeding in many cases.

It may be noted that the operative mortality in this series was not associated with hemorrhage. There were three deaths, one the result of a deep seated prostatic abscess following the operation with ascending infection, one from a vesical perforation when the cautery punch had been used, which does not permit of adequate vision, and one from uremia and coronary sclerosis in a poorly chosen case.

I do not mean to infer by this that bleeding was not at times a distressing complication. It occurred in seven cases of the series, usually twenty-four hours after operation. In three cases immediate electrocoagulation of the bleeding points through the direct cystoscope controlled it. In three cases there were too many clots in the bladder to permit of this procedure and cystostomy was necessary. In the other case a transfusion sufficed.

I have frequently noted skepticism among members of the profession with regard to the permanency of the results obtained from a punch operation. As I have stated, prostatectomy was performed in ten of our cases later. In carefully reviewing these failures, I found that in seven of the ten cases marked enlargement of the gland (as palpated by rectum) was present, and in those in which this was not so pronounced intraurethral bilateral hypertrophy had been noted on cystoscopy. In all but three cases the subsequent prostatectomy was performed within a few weeks of the first operation.

In only four cases of the 168 studied was subsequent prostatectomy necessary at the end of a year. Caulk has stated: "If a man remains well for six months he usually will remain well forever."

We have recently heard from ninety-nine of the patients from whom only inflammatory tissue was removed by the punch and who did not

show evidence of adenomatous hypertrophy. Fifty report themselves as cured, twenty-four as improved, and twenty-five as unimproved. In reviewing these failures of the inflammatory group, it may be noted that ten cases, as demonstrated by subsequent prostatectomy, were poorly chosen for the punch operation. The other fifteen cases represent such extreme degrees of prostatitis that it is doubtful if even complete prostatectomy would have afforded relief.

In the entire series of 168 patients 123 were heard from; 53 per cent reported complete cure, 25 per cent reported improvement, and 23 per cent were not benefited.

These observations, I believe, demonstrate how limited is the field for the punch operation and how much care must be exercised in the choice of cases. For unless all obstruction is relieved by the procedure, symptoms of obstruction will persist.

In conclusion I would like to emphasize that: (1) adenomatous hypertrophy is not a contraindication to a punch operation but when confined to the median lobe offers the best prognosis; (2) cauterization of the neck of the bladder is followed by more severe and longer febrile reactions than excision by knife; (3) sufficient tissue must be removed to relieve obstruction; (4) lateral lobe hypertrophy is a contraindication to the punch operation, and (5) fear of hemorrhage need not deter one from utilizing the punch operation.

THE ROENTGENOLOGIC DIAGNOSIS OF CARDIAC DISEASES*

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THE roentgenologic diagnosis of acquired cardiac disease is dependent upon two important premises. The first is that almost all organic disease of the heart produces hypertrophy of its muscle and dilatation of its chambers. The enlargement may be general or may be confined to one part of the heart, depending upon the type of pathology which is present. The diseased heart, then, undergoes significant changes in its size and shape.

The second premise is that the size and shape of the heart can be determined, roentgenologically, with a great deal of accuracy. The *x*-ray examination is a part of the physical examination of the patient and in this instance is a substitute for percussion. Even in the hands of the best physical diagnosticians, percussion is grossly accurate only 65 per cent of the time. It becomes particularly unreliable in two groups of cases: those which are borderline and in which the determination of a slight cardiac enlargement is of great importance; those in which there are considerable secondary changes in the lungs making percussion most difficult. Roentgen examination with proper technic can determine the transverse diameter of the heart with an error of less than 5 per cent.

Space does not permit a discussion of technical factors, which are, nevertheless, of great importance, nor of many of the methods of measurement. The simplest and most generally valuable method of measurement is illustrated in Figures 1 and 2. The thorax is measured from the inner margin of the ribs at the level of the diaphragm. The midpoint of the chest is thus found and measurements made from it to the extreme left border of the heart (Ml) and to the extreme right border (Mr). The total of these is the transverse diameter of the heart, which normally measures 35 to 50 per cent of the transverse thoracic diameter, although in some markedly hypersthenic individuals the ratio may become 55 per cent. A wide variation in the size of the heart in normal individuals occurs; the total transverse diameter may vary from 7.0 cm. to 14.5 cm. This corresponds with the post-mortem weight of normal hearts, which ranges from 200 to 450 grams. The use of the cardio-thoracic ratio helps to determine enlargements in spite of this marked variation in size.

In the consideration of every case suspected of heart disease two problems present themselves. The first concerns itself with the ques-

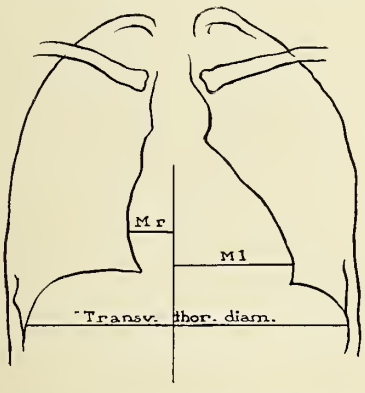

Fig. 1. Outline of normal heart in hypersthenic individual. Note the slight convexity of the left border and the prominence of the left ventricular curve.
A simple method of cardiac measurement is also illustrated.

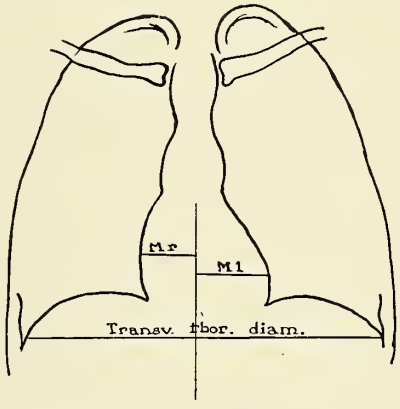

Fig. 2. Outline of normal heart in sthenic individual.
The method of measurement is again illustrated. The sum of Mr and Ml equals the total transverse diameter of the heart, which, in the normal, should be from 35 to 50 per cent of the transverse thoracic diameter.

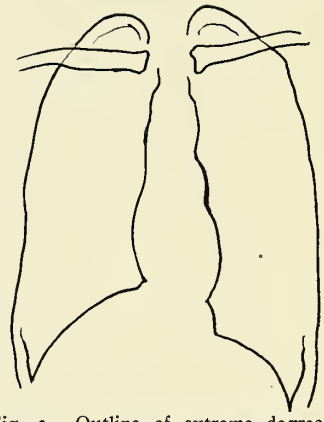

Fig. 3. Outline of extreme degree of "drop" heart in asthenic individual.

*Presented before the Northern Minnesota Medical Association, Fergus Falls, Minn., Aug. 20, 1928.
From the Department of Roentgenology of the University of Minnesota and the University Hospital, Minneapolis, Minn.

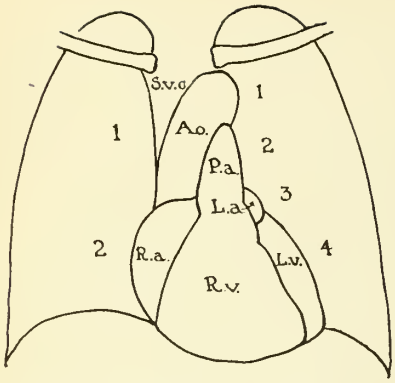

Fig. 4. Diagram of roentgenographic anatomy of the normal heart. R.a., right auricle. S.v.c., superior vena cava and vessels of neck. Ao., Aorta. P.a., pulmonary artery. L.a., left auricular appendage (only seen occasionally). L.v., left ventricle. R.v., right ventricle. Right side: 1, curve of ascending aorta. 2, curve of right auricle. Left side: 1, curve of arch of aorta. 2, curve of conus pulmonalis. 3, curve of left auricular appendage (only seen occasionally). 4, curve of left ventricle.

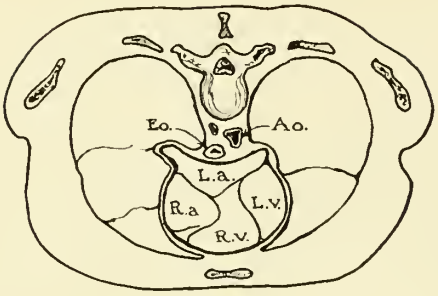

Fig. 5. Diagram of cross section through thorax showing antero-posterior position of chambers of heart and relationship of esophagus to heart. Note that the left auricle is posterior and in close relationship to the esophagus. Eo., esophagus. Ao., descending aorta. L.a., left auricle. R.a., right auricle. R.v., right ventricle. L.v., left ventricle.

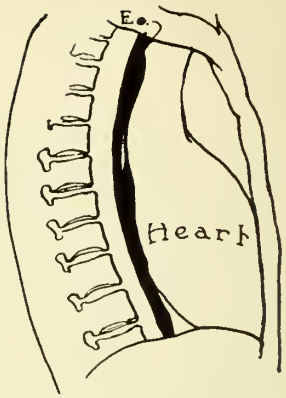

Fig. 6. Outline of right lateral view of barium-filled esophagus (Eo). The close relationship of the esophagus to the posterior wall of the heart and the clear space between it and the spine are well shown.

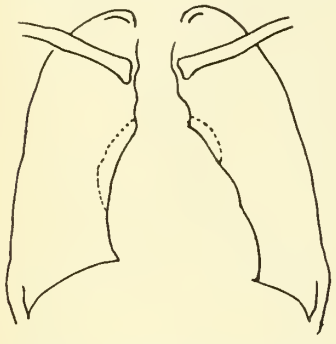

Fig. 7. Outline of heart in mitral stenosis of moderate degree. Note the moderate increase in diameter, the convexity of the middle portion of the left border, and the dilated pulmonic vessels (broken line).

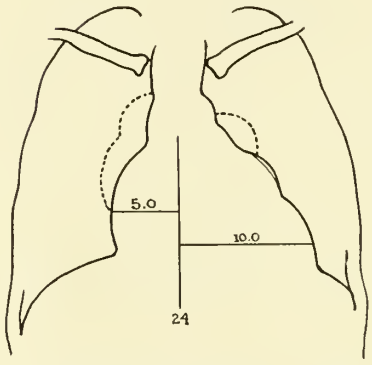

Fig. 8. Outline of heart in mitral stenosis and regurgitation of marked degree. Note the increase in cardio-thoracic ratio, the marked convexity of the left border, the bulging of the conus pulmonalis, and the dilated pulmonic vessels (broken line).

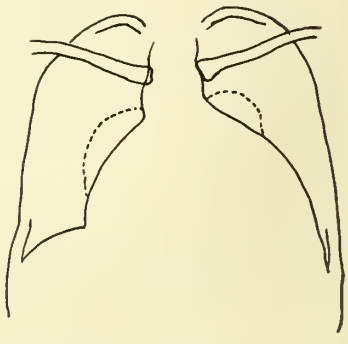

Fig. 9. Outline of heart in mitral disease of extreme degree. Note the massive enlargement of the heart, both to the right and left, the extreme convexity of the left border and the dilatation of the pulmonic vessels (broken line).

tion as to whether or not there is organic disease of the heart present. Frequently this can be best answered by the determination of the size of the heart, as organic disease usually causes appreciable enlargement. As pointed out above, this determination can best be made by the roentgenologic method because of its accuracy.

The second problem concerns itself with the type of cardiac or vascular pathology which is present. This can frequently be best answered by the determination of the shape of the heart by the roentgenologic method. The normal heart varies greatly in shape as well as in size. The typical appearance of the heart in the average or asthenic individual is shown in Fig 1. It has a slight concavity in the middle of its left border. In the hypersthenic individual this concavity tends to be somewhat accentuated and the left side of the heart is more prominent (Fig. 2). In the asthenic individual the heart appears long and narrow and more centrally placed. It is often somewhat convex on its left border and may be of the so-called "drop" type, an extreme example of which is shown in Fig. 3. The anatomy of the heart as seen in the ordinary postero-anterior roentgenogram is shown diagrammatically in Fig. 4. The upper portion of the cardiac shadow is entirely composed of the large blood vessels while the heart itself extends below the domes of the diaphragm. Two curves are present in the outline of the right border of the heart, the inferior representing the right bor-

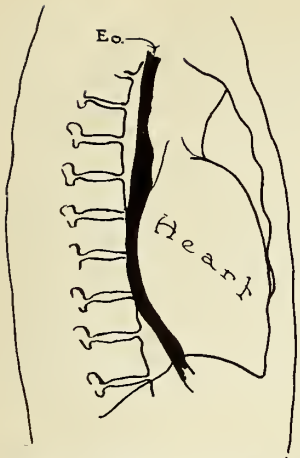

Fig. 10. Right lateral view of barium filled esophagus (Eo) in a case of mitral disease of moderate degree. Note the compression and posterior displacement of the distal portion of the esophagus and the partial obliteration of the space between it and the spine. (Compare with Fig. 6.)

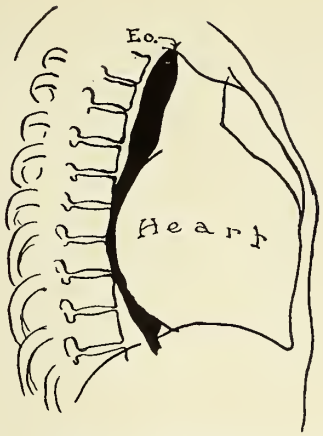

Fig. 11. Right lateral view of barium filled esophagus (Eo) in a case of mitral disease of marked degree. Note the compression and posterior displacement of the segment of esophagus in contact with the dilated left auricle and the obliteration of the space between the esophagus and the spine. (Compare with Figs. 6 and 10.)

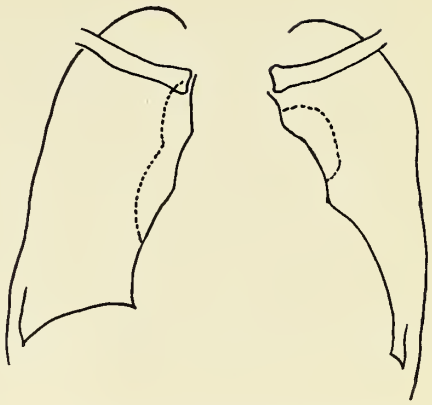

Fig. 12. Outline of heart with combined aortic and mitral valvular disease. Note the marked enlargement of the left ventricle; prominence of the inferior curve of the left border, in addition to the bulging of the conus pulmonalis; prominence of the second curve of the left border. The dilated pulmonic vessels are also shown (broken lines).

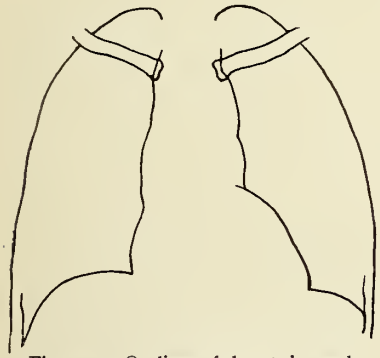

Fig. 13. Outline of heart in early hypertension. Early aortic valvular disease may give the same appearance. Note the concavity of the left border and the prominence of the inferior curve—the left ventricle. There is very little increase in the transverse diameter of the heart.

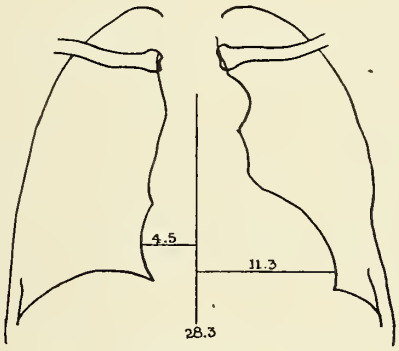

Fig. 14. Outline of heart in aortic regurgitation and stenosis in the second stage. Hypertension may give the same appearance. Note the marked enlargement of the left ventricle—the prominence of the inferior curve. The measurements indicate a marked increase in the cardio-thoracic ratio.

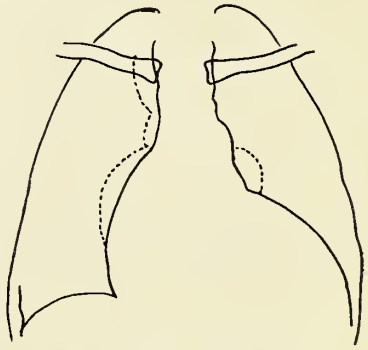

Fig. 15. Outline of heart in long-standing hypertension after repeated decompensation. The tremendous enlargement of the whole heart is well shown but the concavity of the left border and the preponderance of the left ventricle are maintained. The dilated pulmonic vessels (decompensation) are also shown (broken lines).

der of the right auricle, the superior the ascending aorta. On the left side can be seen, from above downward, the arch of the aorta, the conus pulmonalis or beginning of the pulmonary artery, and the left border of the left ventricle. Occasionally the appendage of the left auricle may produce a fourth curve on this side, as illustrated.

A study of this diagram (Fig. 4) will reveal at once what shape the heart will assume with various diseases. In abnormalities of the mitral valve, for example, the right ventricle will be enlarged, the pulmonary artery dilated, the curve of the conus pulmonalis will therefore be exaggerated and displaced upward to the left. The result is that the normal concavity of the left border become a convexity. In aortic valvular disease or in hypertension, the reverse is true. The left ventricle is enlarged and protrudes farther to the left, producing a marked increase in the concavity of the left border, while the aorta itself become broader. In toxic conditions of the myocardium and in myxedema, a diffuse dilatation of the cardiac chambers takes place without affecting materially the large vessels, so the heart takes on a flask shape, the base being narrow, while the inferior portion is broad and flat looking.

The position of the various chambers of the heart and their relation to the esophagus is shown diagrammatically in Fig. 5. This cross section through the thorax indicates that the left

auricle lies posterior to the heart and in close contact with the esophagus. From this it can be seen that enlargement of the left auricle must produce a compression and posterior displacement of the esophagus. Visualization of the esophagus by means of barium sulphate may, therefore, give valuable information, particularly toward the establishment of a diagnosis of mitral disease. The appearance of the barium-filled esophagus in relation to the normal heart is shown in Fig. 6. It should be noted that it runs fairly straight through the thorax and is so constantly present with disease of the mitral valve. Enlargement of the left auricle is almost always present in mitral disease if the patient is having symptoms. Posterior displacement of that portion of the esophagus which is in contact with the left auricle then occurs as shown in Fig. 10 in moderate degree, and in Fig. 11 in marked degree. This sign may be very valuable in deciding doubtful cases.

The type of cardiac enlargement which occurs with disease of the aortic valves, either syphilitic or rheumatic, is essentially the same as that

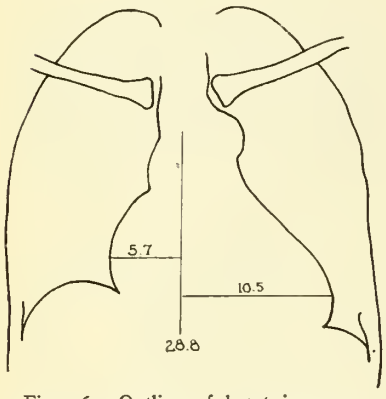

Fig. 16. Outline of heart in myxedema of moderate degree. Note the marked enlargement of the heart both to the right and left with disproportionate enlargement to the right.

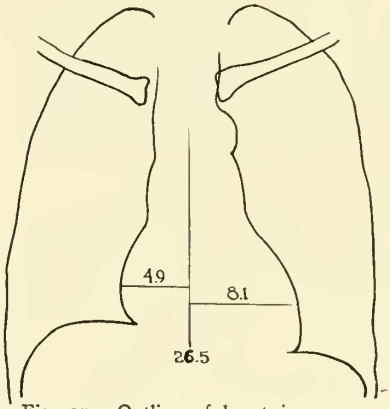

Fig. 17. Outline of heart in same case six weeks after thyroid medication. The transverse diameter of the heart has been reduced by 3.1 cm.

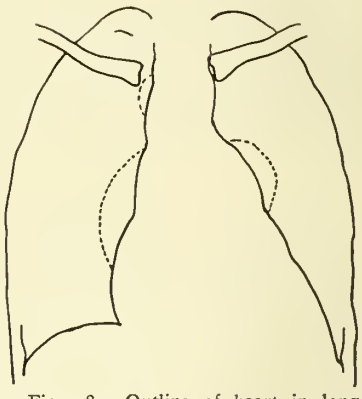

Fig. 18. Outline of heart in long standing chronic bronchiectasis and emphysema. The convexity of the middle portion of the left border is shown due to the enlargement of the right ventricle and to dilatation of the conus pulmonalis. The shape resembles that of mitral disease but in this condition there is no displacement of the esophagus because the enlargement is entirely on the right side.

maintains a distinct space between itself and the spine, while it is in close contact with the posterior wall of the heart.

Brevity necessitates the description of only the most common types of cardiac pathology. Cardiac enlargement from disease of the mitral valve tends to produce roentgenograms such as are illustrated in Figures 7, 8, and 9, all of which are from cases of rheumatic origin. It should be noted that there is a distinct enlargement of the transverse diameter of the heart as well as a change in shape. The left border shows a marked convexity, of varying degree, due to the enlargement of the median curve, which is produced by the right ventricle and the conus pulmonalis. The left ventricle is only moderately enlarged. There is also a marked enlargement of the root shadows of the lungs due to the congestion of the pulmonic vessels which of hypertension. In each case the left ventricle is enlarged. Some minor differences are present but in general it should be considered that the two types cannot be distinguished positively. In the early stages of aortic disease or of hypertension, there is only hypertrophy of the left ventricle. This manifests itself in the roentgenogram by an increased prominence of the inferior curve on the left side and an increased concavity of the left border without any marked increase in the transverse diameter of the heart (Fig. 13). As the disease progresses, dilatation becomes more marked, the concavity more striking. The heart takes on the typical "boot" shape (Fig. 14). In the later stages a more diffuse enlargement occurs, the other chambers taking part in it. At this time the heart may be enormous in size, and enlargement to the right as well as to the left may be noted. The concavity of the left

border and the marked prominence of the left ventricle are, however, still preserved (Fig. 15).

The combination of aortic and mitral valvular disease may occasionally produce a fairly characteristic roentgenogram (Fig. 12). It should be noted that there is marked bulging of the curve of the conus pulmonalis in addition to a very massive enlargement of the left ventricle. The diagnosis of the combined valvular lesions is not always possible, however, as one or the other may so predominate as to give the appearance of a lesion of only the one valve.

Thyroid insufficiency in some cases produces a marked dilatation of all the cardiac chambers. This produces a flask-shaped heart with a broad flat appearance and an especially marked enlargement of the right side (Fig. 16). On thyroid medication this enlargement disappears more rapidly than in any other type of cardiac disease (Fig. 17). Hyperthyroidism, in our experience, does not give any type of cardiac enlargement which is at all typical. Long standing toxemia may occasionally produce a myocardial degeneration which expresses itself by a general cardiac dilatation. The roentgenographic appearance is similar to that seen in myxedema (Fig. 16). Chronic pulmonary disease of many years duration such as asthma, emphysema, bronchiectasis, and fibrosis, may produce right ventricular hypertrophy and dilatation. The roentgenogram of such a heart (Fig. 18) may resemble that of mitral disease but there is no enlargement of the left auricle and, therefore, the esophagus will not show the characteristic posterior compression and displacement.

(Note: The accompanying illustrations, with the exception of Figures 4 and 5, are all made from tracings of original roentgenograms.)

SUMMARY

Organic heart disease usually produces enlargement of one or all the chambers of the heart. A change in size and shape results.

The roentgen method is the most accurate means of determining the exact size and shape. The determination of an enlargement of the heart by this method may thus be the deciding factor in making a positive diagnosis of heart disease.

The determination of the shape may aid greatly in diagnosing the type of pathology present.

Visualization of the esophagus may also assist in the diagnosis, as it may be compressed and displaced by enlargement of the left auricle.

Disease of the mitral valves produces essentially three roentgenographic findings: (1) a distinct increase in the transverse diameter of the heart; (2) a marked convexity of the left border due to enlargement of the conus pulmonalis; (3) a posterior displacement and compression of the esophagus in that portion which is in contact with the left auricle.

Disease of the aortic valves and hypertension produce practically the same roentgenographic findings. Essentially these are: (1) a marked concavity of the left border of the heart; (2) prominence of the left ventricle; (3) increase in the transverse diameter; (4) a general enlargement (late) of the whole heart with the left ventricle predominating.

Thyroid insufficiency may produce a flask-shaped heart which rapidly decreases in size on thyroid medication. Toxic conditions of the myocardium produce the same type of heart. Chronic lung conditions may produce a cardiac enlargement whose shape is similar to the mitral heart but without esophageal displacement.

PRESIDENT'S ADDRESS*

J. S. Holbrook, M.D.
Mankato, Minnesota

PERMIT me to express to you my appreciation of the great honor you have conferred upon me in making me President of this Association for 1928.

May I have the same feeling of pride in having held this position as was recently expressed to me by Doctor M. Sullivan, one of the first members of the Minnesota Valley Medical Association, which combined with the Southern Minnesota Medical Association many years ago to form the present society. He said, "I feel that one of the greatest honors of my life was being President of the Minnesota Valley Medical Association. I always look back to those early days of the Society as the happiest of my life." Doctor Sullivan is now living in Southern California and, although he is about seventy-five years of age, is still enjoying quite good health.

Physicians of that time had to contend with difficulties and hardships which we cannot realize. Think of the poor roads, horse-drawn vehicles, and lack of equipment in their offices as compared with the modern highways, automobiles and modern office equipment. Their knowledge of asepsis and modern anesthetics was limited; they had no radium, *x*-ray, insulin, nor many other things which we use as a matter of course in our daily work.

Recently there came into my possession three old medical books, which I value very highly. One was printed in 1810, or about 118 years ago. This was "The American New Dispensatory" and contained information concerning the older drugs, some of which we use today. The others were the Surgical Works of John Abernathy, Fellow of Royal Society and Surgeon to St. Bartholomew's and Christ's Hospitals in London. These books were printed fifteen years later, or in 1825; not so long ago, as the progress in world affairs is counted.

At that time surgeons were groping in the dark, so to speak, looking for a cause of suppuration, and patients died of infections and inflammations.

Doctor Abernathy was a very fluent writer and his books contain many orations presented to the College of Surgeons, but the bulk of his work was case records. He had a firm belief that the conditions of the liver and stomach caused local diseases. It is interesting to note that whenever a case presented any difficulties, the usual treatment was to give a five grain mercury pill and senna daily, or some other cathartic, and, strange as it may seem, many conditions which the history would indicate as incurable showed wonderful improvement.

He had an anatomical classification of tumors which was interesting.

He did the operations for puncture of the bladder, the removal of tumors, drainage of lumbar abscesses, and removal of floating cartilages from the knee joint, and many others. That the author was well thought of may be judged by his recital of numerous cases in which he was called in consultation.

I ran across the statement which showed that he was well pleased with the progress of surgery of his time, for he said, "Surgery has reached its finality."

This statement set me to thinking and comparing his time with ours. It is said that nearly all operative cases at that time developed pus in the wounds, and if there was not pus present, something was wrong. He reports several cases where healthy or good pus was let out of lumbar abscessess. In phlebotomy he reports several cases of badly inflamed arms because of a poisoned knife, or because the patient's arm was not kept quiet, thus allowing the edges of the wound to rub together and cause inflammation.

Blood letting was practiced frequently. There were shops along the streets where this practice was carried out by the barbers, but at this time the physicians were also using blood letting, and he reports that he had a desperate case which he bled four times in one day, but in spite of this the patient died.

In the Massachusetts General Hospital, there still remains relics of the heroic means surgeons had to take at that time. Without the benefit

*Presented to the members of the Southern Minnesota Medical Association, Rochester, Minn., Oct. 2, 1928.

of anesthetics, the patient had to be tied down securely to assure his remaining reasonably quiet during the operation. In one of the rooms at this hospital one may still see hooks in the walls which were used as anchors for the ropes which secured the patient. The best surgeon was the one who could operate rapidly and who did not let the cries of his patient hinder him. In this very room Doctor John Warren, in 1846, performed the first reported abdominal operation with the patient under ether. At the conclusion of the operation, as the patient was waking up, Doctor Warren turned to the interested group of surgeons present and remarked, "Gentlemen, this is no humbug."

Previous to this time surgeons displayed great courage in doing the necessary limb amputations, skull operations, and occasional abdominal sections without anesthetics or asepsis. But with the discovery of ether and chloroform at about this time a great change came. The instant wiping out for all time of the pain experienced during operations was a great boon to humanity.

The second obstacle to the surgeon's work was sepsis. For example, 6 per cent of all cases of compound fracture died. Now about one per cent result fatally. Operative wounds ran with laudable pus and no wound was expected to heal without it.

Lister, about 1850, began his work in medicine and became one of the most renowned men in medical history, principally because another great physician, Pasteur, had experimented and investigated and found micro-organisms in suppurating wounds. Lister found that he could destroy these germs chemically, and applied this knowledge to his surgical cases. Immediately there was a great reduction in the mortality and at about the end of our great Civil War, Lister made known the results of his discoveries. Antiseptic surgery spread rapidly, and surgeons the world over operated with much more assurance of success.

These two great events—the use of ether and chloroform, and Lister's discovery of antiseptics—have done more to advance surgery than all other discoveries.

I believe that we all feel a great pride in the achievements of our own day. They have not come by any sudden developments but through research work of many men working in laboratories all over the country. I well remember the fiftieth anniversary of the use of ether for anesthesia, celebrated at the University of Minnesota in 1896.

That same year also Behring gave to the world the diphtheria antitoxin, making almost harmless the disease which carried off most of the children and young people of Mankato thirty or forty years earlier. Some of the old physicians used to tell of the terrible experiences with this dreaded disease.

Other discoveries came in rapid succession. In 1896 the roentgen rays developed by the old revolving static machine began to be used. One could take an *x*-ray of the hand in several minutes. A kidney shadow required one-half hour exposure and was very unsatisfactory at that. Improvement in the *x*-ray machine has made possible wonderful films in a few seconds exposure; has made possible satisfactory examinations of the stomach, the kidneys, the colon, the lungs, and the determination of disease of the gallbladder.

Some of the other developments of our time have been announced with such suddenness that one forgets the long weeks or months which were spent in their development. The announcement of insulin startled the world and seemed to most of us to be a discovery almost accidental, but the facts are that research workers all over the world had long been using the pancreas in attempts to find a cure for diabetes.

Typhoid vaccine has nearly eradicated that disease, especially in the Army. The diphtheria, tetanus, and other serums have produced wonderful results. The use of Lugol's solution of iodin in connection with goiter has been very beneficial. Near-miracles are daily produced by the removal of toxic goiters. Many diseases are cured by the removal of focal infection. The liver diet has relieved many cases of pernicious anemia. Chaulmoogra oil has cured some cases of leprosy. There are many other examples of advancement that medicine and surgery has made in the last quarter century.

We wonder what will come next, and many feel like remarking, as Doctor Abernathy did, that surgery (and medicine) have reached their finality.

All these advancements have had much to do with the lengthening of the average life of man. The olden-day physician healed if he could, while

today great stress is being put upon keeping well. Sanitation and preventive medicine, including periodic health examinations, are doing much to reduce to a minimum, sickness and disease, but further increase in the longevity of man will have to come from reduction of the mortality from high blood pressure, Bright's disease, and those conditions which result from the wearing out of human tissues occurring beyond middle life, and also from the eradication of cancer.

If there is anything which the progress of science has taught, it is the necessity of an open mind and the readiness to accept what at first seems startling.

LIVER EXTRACT NO 343

The Council publishes a report of the Committee on Pernicious Anemia of the Harvard Medical School on Liver Extract No. 343. The report outlines the work of the committee in developing a potent liver extract for use in pernicious anemia and the studies carried out with the product of Eli Lilly and Co. which was eventually accepted for New and Non-official Remedies and placed on the market. Subsequently the committee found that certain lots of this product were weaker than the product manufactured for five months previously. Eli Lilly and Co. collaborated with the committee by withdrawing so far as possible this material from distribution. Recent tests have demonstrated that material of standard strength has again been produced and the committee believes that Eli Lilly and Co. can now recommence distribution of the standard product on a commercial scale. (Jour. A. M. A., June 30, 1928, p. 2102.)

TREATMENT OF TYPHOID BY SO-CALLED DETOXICATED VACCINE

The formaldehyde detoxification principle elaborated by Ramon has been applied to typhoid vaccine. The method consists in incubating cultures of the typhoid bacillus with formaldehyde in such a manner that the toxic principle is destroyed while the antigenic properties remain, and is similar in principle to diphtheria toxoid (which has been admitted to New and Non-official Remedies). The number of cases on which this vaccine was tried does not permit the drawing of conclusions as to its value. (Jour. A. M. A., November 3, 1928, p. 1378.)

PERTUSSIS BACILLUS VACCINE

Vaccine made from stock cultures has been used with a great variety of success. Certainly as used it does not prevent all cases, nor does it cure a great percentage of those who have contracted the disease. Its use is not harmful so far as we know and the reactions are slight, if any. For this reason it may seem desirable at times to use it even though results may not be encouraging. (Jour. A. M. A., November 3, 1928, p. 1394.)

THE INJECTION TREATMENT OF VARICOSE VEINS*

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Minneapolis

FOR a number of years, I was performing so-called ambulatory excision of varicose veins. A large percentage of these were complicated by ulcers and were potential infections and for this reason the method was discontinued. A number of patients, where ulcer was present, were treated with parathyroid extract on the theory that these were the result of lowered calcium metabolism. Practically no results could be seen from this method of treatment, excepting possibly in two cases, so it was also discontinued. These cases received the medication by mouth and not hypodermically. They were not given supportive treatment or injections at the time.

Tavel, in 1904, tried to popularize the injection treatment of varicose veins by using a 5 per cent phenol solution, but he met with so little enthusiasm or success that the method was practically discarded by him until after the World War. Linser, working in the Tubingen Clinic in 1911, accomplished good results by the use of one half of one percent sublimate solution. For high situated varicosities, especially near the inguinal region, he used a 15 to 30 per cent sodium chloride solution. However, after the World War it was noted especially throughout France that when a novarsenical product very rich in soda was injected, there was produced a rapid sclerosis of the venous segment injected. This sclerosis of the vein resulted usually without pain, edema, motor interference, trophic complications, or phlebitic reaction. It was soon determined that arsenic was not the causative agent for the venous sclerosis, but that the soda associated was the causative factor. Among the various drugs tried, sodium bicarbonate was rapidly discarded on account of the escharotic action. Sodium salicylate was used and this proved very effective. Sicard and Genevrier were very enthusiastic with the results obtained by using a solution of sodium salicylate that varied in strength from 20 to 40 per cent, the quantity to be injected varying from 2 to 6 c.c. according to the strength of the solution used. J. A. Sicard and L. Ganguir had very good results with biniodide of mercury but this was discarded on account of the painful reaction that resulted on the following day. However, salicylate injections were not successful. Sicard used the biniodide of mercury. Waite uses either quinine or sodium salicylate solution. In the states, of the men who are doing a great deal of this work, McPheeters prefers a sodium chloride solution, while Hayes prefers a bichloride solution.

During the past three years, at the University Dispensary and in my office, I have treated over four hundred cases by the use of sclerosing solutions, and the knowledge gained from this experience will be dwelt upon in this paper.

So many different opinions and theories have been given of the cause of varicose veins that a detailed discussion here is inadvisable, yet a few remarks might be made. There is undoubtedly a hereditary factor to be considered. Obstruction plays a part, as is evidenced during pregnancy, or by the wearing of tight bands or garters. Tumors within the pelvis and probably habitual constipation also play a part. Turner of London lays great stress upon obstruction at the oval window, which is due to an anatomic structural deformity. It is my opinion that varicose veins result from two conditions: heavy work in a fixed standing position, so frequently seen in street-car motormen, laborers and the like; and a hereditary defect or anomaly in the valves of the veins. An interesting phase of this condition is the frequent association of flat feet —estimated by various observers to be between twenty-five and fifty per cent. Just as so many cases of flat feet develop after a prolonged illness such as typhoid fever, so, also, do varicose veins or varicosities develop following such infections.

It does not seem conceivable that with a disability that causes such a varied group of symptoms, some so severely incapacitating, no research work in regard to embryology of the venous system was carried out in detail until Kempmeier's

*Presented before the Northern Minnesota Medical Association, Fergus Falls, Minn., Aug. 20, 1928.

work in 1926 on the "Origin and Mode of Venous Valves." Description of topographical arrangement of veins corresponds quite well in all standard text books. It is Kempmeier's belief that factors underlying functions of valves must be sought, not in the circulation itself but extrinsically, that is, in the effects of compression upon the peripheral venous plexus. Peripheral valves are laid down primarily in areas of muscular activity at the time that the fetus begins to execute skeletal movements, while intrinsic gateways of propulsive force, for example the heart, are laid down much earlier. The first valves of the saphenous veins in the human fetus are laid down and begin to form at approximately three and one-half months and are completely formed at the end of the fifth month of intra-uterine life. They occur first in the upper or proximal end of the saphena magna. In their formation, there is first noticed a pair of inconspicuous or transversely placed endothelial ridges inside the veins. By the invasion of the mesenchyme, the elongation and slanting of the ridges, there is a concavity formed on the leeward side and the anlagen are gradually converted into valval sacs. With this, there is a retardation in growth and a deficiency in the circular muscle development of the tunica media. In the newborn, the vein is only one-fourth or one-fifth as wide at the point of attachment of the valves as in other parts of the vein. The valves are usually bicuspid, but atypical valves either unicuspid or tricuspid may develop. Most valves are located just distal to tributaries or they may follow in close sequence—as many as three valves being found in a distance of 4 mm. As to the number of valves in the veins of the lower extremities, opinions vary. Hess found one in the femoral vein above the communication with the saphena magna in seventy-two per cent of cases, and two in another five per cent. Valves were always present below that point and were almost without exception bicuspid in character. Rarely, was a tricuspid valve found and at times, instead of well shaped cusps, they remained as anlagen—which look like a shallow arched cicatricial contraction or furrow running transversely in the intima of the vein. According to Bardeleben, below the point of entrance of the saphena magna, the valves may vary as low as four, and according to Cunningham as high as twenty. Kosinski, in a study of the saphena parva in a series of one hundred and twenty-four legs, found the aggregate of valves to be between seven and eleven in sixty per cent of the cases —independent of the age or size of the individual, the youngest being twenty-three years of age and the highest number thirteen in two men, one of whom was 88 years of age.

Fig. 1. Gross section showing a slough or ulcer well circumscribed by normal fat and the thrombosed vessels extending into the area.

The symptoms for which patients with varicose veins come for relief may vary from cosmetic reasons only, to those of complete incapacitation. There may be edema of the legs associated with pain of a dull type which may increase to that of cramp so severe as to incapacitate the individual. The cramps usually come on after the patient has been working for several hours and are most commonly complained of by clerks or persons working in a standing position for an extended time. At times, it is difficult to determine whether pain comes as a result of associated flat feet, or as a result of the varicose veins. Edema of the legs is quite common and this may be associated with a recent phlebitis. Ulcers may be present and they may almost completely encircle the leg. They are commonly located on the inner surface of the leg and become more and more frequent as the region of the internal malleolus is approached. This corresponds to the terminal distribution or source of the saphena magna, where the venous pressure is the greatest, especially during the process of walking. Here,

the pendulum movement of the lower extremities must be considered in increasing the pressure. In point of frequency of location, the outer surface of the leg, extending down to the region of the external malleolus, comes next. This marks the terminal source of the saphena parva. If careful examination is made, there will usually be found a venous varix proximal to the ulcer,

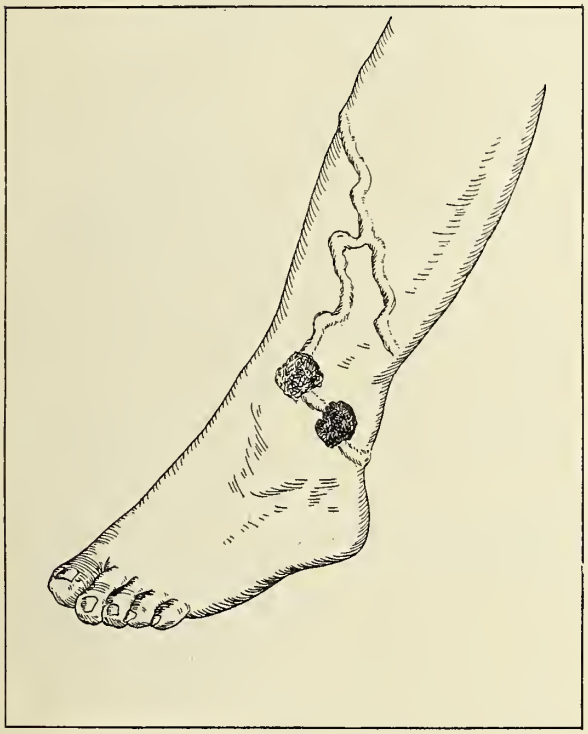

Fig. 2. Ulcers always have a varicose vein extending into the base of the ulcer. It is always present though at times it may be difficult or impossible to see or palpate. The varicosity may even extend from below upward or, as very often happens, it may extend into the ulcer from a lateral direction.

although it may be entirely concealed. Some of these low placed ulcers give almost unbearable pain, especially at night. Occasionally, there is seen an eczema of the leg. Where there is an associated fungus infection, the picture is difficult to differentiate from a malignancy. Itching of the legs may be so severe as to cause great loss of sleep, and slight hemorrhage is quite common as a result of scratching in order to seek relief. A few cases of seemingly incurable eczema of the upper extremities have been reported cured by the sclerosing of varicose veins of the forearm. Occasionally, pain in the region of the knee with inability to flex the leg at the knee is seen. To illustrate this, I am going to report briefly an interesting case that had gone the rounds of medical men.

A fleshy man, 54 years of age, had such severe pain in the region of the left knee as to cause inability to flex the leg. He had been *x*-rayed for tuberculosis and had received the usual anti-rheumatic treatment. An unusually large varix was present below the knee.

The first injection consisted of ten c.c. of invertose according to the technic to be described. Two days later he reported complete relief of symptoms, and two weeks after beginning treatment this man, who had been incapacitated for several months, was pursuing a gainful occupation.

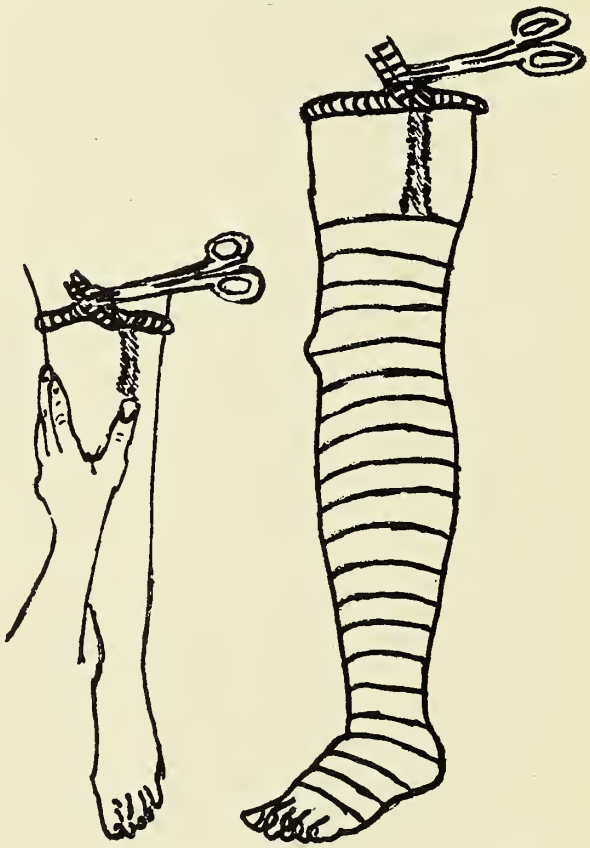

Fig. 3. Method for injection of solution, after emptying leg with or without bandage applied. After veins are almost emptied by elevating leg to a horizontal or higher position, a tourniquet is applied. Then the upper region of the vein can be made prominent by milking the vein in an upward direction, thus causing a lumen of increased size and easier introduction of the needle. With the intertose or glucose solution a needle of No. 19 or 20 caliber is more suitable for injection.

The mechanism of healing of varicose veins after the injection of sclerosing solution was very well worked out by Regard. There is first a swelling of the vessel wall with a separation of the cells of the wall by edema. The cells are bathed in an exudate of lymphatic fluid containing very few leukocytes. The muscle fibres are

shortened as in a state of contraction. The endothelial cells are first swollen and then are detached into the lumen of the vein. There is then a fibrinous deposit formed on the inner surface of the vein. The fibrinous blood clot which forms and fills the entire lumen of the vein becomes organized and constricts the vessel. At first, a fibrinous deposit adheres to the wall, but later, fibrolasts and capillaries penetrate the thrombus. The vein is destroyed by the organization of the thrombus, but in course of time it is transformed into a thin fibrous cord in which only a few muscle fibres are demonstrable. Where the caliber of the vein is large, and thickening of the vein does not take place thereby causing a lumen of reduced size, there may be only the fibrous deposit within the intima, with no resultant thrombosis. Here, there is a quite rapid repair of the injured endothelium with failure to accomplish the desired result. Where the tributaries of the vein to be injected are large, this is very apt to happen.

Tissue infiltration of injected fluid results in a moist or dry slough according to the solution used. These sloughs are very annoying and obstinate to treat, and may require from one to five months' attention.

During the past year and a half, Linser has been using sodium chloride solution according to the technic of V. Meisen, who popularized this solution. It has advantages over the sublimate solution in that large quantities which are necessary in order to thrombose large veins can be used without producing toxic phenomena, with exception that it may produce a hemoglobinuria. However, the sloughs produced with poor or incorrect technic are just as difficult to heal as the sloughs from sublimate solution. Sugar solution in the form of calorose or invertose has been extensively used by Ludwig and Nobl. This solution does not produce sloughs unless injected in perivenous tissues in large quantities.

During the past three years I have been using various solutions: quinine hydrochloride, mercury bichloride, sodium chloride, sodium salicylate, glucose and invertose. The objection to the injection of quinine solutions was that pain and swelling resulted along the varicosities for several days after treatment, and also that quinine may produce undesired results during pregnancy. Some people also have an idiosyncrasy to quinine. Often there was a red, swollen area extending along the tract of the vein for several days. However, the reaction is usually not sufficient to cause the patient to be incapacitated.

With bichloride solution there is always the danger of getting a slough and, though it is not a serious condition, it might be difficult to satisfy the patient in regard to this complication.

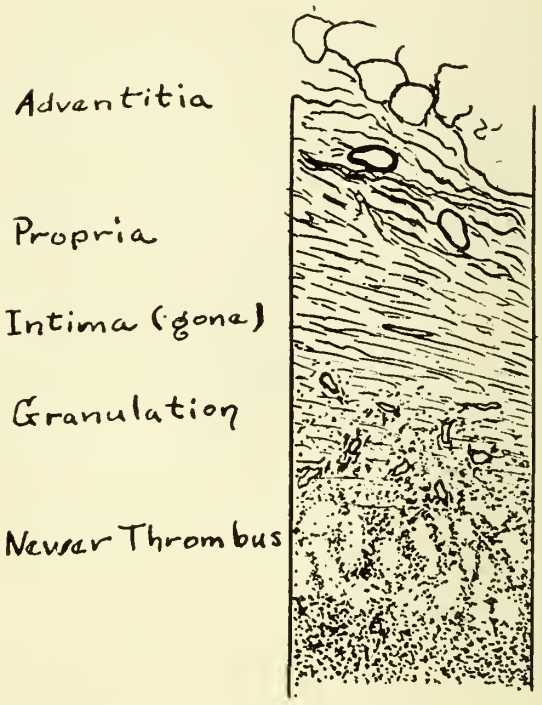

Fig. 4. Microscopical section of an obliterated vein approximately one inch about area where a slough had developed. This shows how completely the intima of the vessel is destroyed. It also shows the firm thrombas that has been formed.

Sodium chloride solution in twenty per cent strength offers the same objections and in addition there results an immediate pain or cramp in the calf of the leg, extending to the foot. The duration of this pain or cramp is only about one minute. Sodium salicylate solution in a twenty per cent strength gives very little pain if not over six c.c. are injected. I am using this only in small veins or where several injections are made at one time, or where no thrombus is formed after injection of the invertose solution. Invertose or calorose is to date the most satisfactory of any drug used. There is very little if any pain unless large quantities are used, and even then the pain is only transitory.

The technic which I prefer is to elevate the leg

so as to have the vein as nearly empty as possible. There will be practically no pressure in the vein when the leg is elevated and slightly flexed. A bandage in the form of an Esmarch bandage is applied from the foot upward to a point about one inch from the point to be injected. With the patient in a standing position, a tourniquet is applied about two inches above the bandage so as to render the vein more prominent and the insertion of the needle easier. The patient is then allowed to either lie or sit down. After the needle is introduced into the lumen of the vein, the bandage is either cut or removed so as to allow the sclerosing solution to flow into the collapsed vein. The circulation of blood in a varicose vein is toward the distal end of the extremity and it will be noted that, as the solution extends toward the foot, there is a contraction or spasm of the injected vein. This does not always appear, but when it is seen the result is almost always good. The higher the concentration of the solution that comes in contact with the intima of the vessel, the better the resultant thrombosis. The more collapsed the vein during the process of injection, the better the cosmetic result. A pad of gauze is immediately placed over the point of injection and held firmly in place with adhesive plaster so that no solution will leak out into the perivenous tissues. If there is any pain immediately on injection, it is better to withdraw the needle and inject at another point rather than take chances of placing the solution in the tissues and having a slough.

I have discontinued mercury entirely on account of the danger of sloughs, and the fact that a nephritis may be set up or a pre-existing nephritis exaggerated.

With the smaller veins, injections should always be stopped as soon as pain is complained of, otherwise there may be a rupture of the vein with filtration of the solution into the tissue with a resultant slough. With sodium chloride solution there is always a cramp in the calf of the leg extending down to and through the foot, which usually lasts up to sixty seconds. It is quite severe but not intolerable. A bandage is applied from the foot upward after the injection so as to keep the vessels in a collapsed state.

Bichloride injections are used where the veins are smaller, the quantity varying from one-half to one c.c. of one per cent, or one to three c.c. of one-half per cent being injected while the patient is in the standing position.

A method with which I have had especially good results with large veins and which required usually one or two treatments consists of opening the vein in the middle or lower third of the thigh and injecting twenty c.c. of sixty per cent invertose or twenty per cent sodium chloride solution after completely emptying the vein. Ligation of the vein above the injection was always performed. Recently, in looking over the literature, I found that V. Meisen, Unger, D. Allaines and Roseau had been using practically this same technic with the idea of preventing any complications, especially that of embolism. However, this is the one real and important complication that we do get away from excepting in a very small percentage of cases with the injection form of treatment only.

In ligation of any vein there is a type of thrombus produced that may lead to embolism, as a thrombus is formed that is not adherent to the entire wall of the vein. Here the endothelium of the vessel above the point of ligature has not been entirely destroyed and an adherent thrombus cannot be formed immediately. To date, I know of only two deaths in this country and two others in Europe. Section will show that it is almost impossible to get an embolism with this treatment. V. Meisen advised against injection above the lower third of the thigh because of the fact that he had an ascending chemical phlebitis in five cases. However, these rapidly subsided with rest in bed.

I have seen one ascending phlebitis where sublimate solution was used, but this was not severe enough to cause any worry as it quieted down with rest. Occasionally, if thrombus formation is effected in a large filled vein, it may appear to the patient that the veins are not obliterated and he will worry about the hard knots or lumps in the leg. These will gradually shrink and absorb almost completely in the course of a few months. An ascending chemical phlebitis can be stopped by placing an adhesive strap over a roll of gauze so as to completely compress the vein above the area of involvement. It may not be necessary to put the leg at rest or apply hot packs if this treatment is carried out.

I am satisfied that with proper technic very few complications will result. If sloughs do re-

sult, the necrotic area should be opened directly into the vein and the clot expressed. This lessens the healing period to about four weeks. The slough is very well circumscribed and if this is done in the course of ten days or two weeks, it can be excised nicely by undermining the skin and making dissection through the healthy fat. I have not had a single slough with invertose or sodium salicylate solution, and only two cases of chemical phlebitis with these solutions and they were with a seventy per cent invertose solution. Sloughs can be prevented by injecting the tissue with a normal sodium chloride solution immediately after the solution has entered the tissue.

Indications or guide to treatment rests with the time filling test as well as the symptoms produced. It has been thought that if the filling time was thirty seconds or less, there was an involvement of the deep veins and an incompetency in the connecting or perforating vessels, thus permitting blood to flow to the superficial from the deep system of veins. If the superficial veins did not fill within thirty seconds, the case was deemed amenable to treatment. However, the actual time taken to fill saphenous veins after emptying depends upon the caliber of the veins, number of their tributaries and position of the leg.

If sodium salicylate or invertose solution is used, there are very few contra-indications to treatment. I cannot see any contra-indication in treating selected cases. Bichloride solution should never be used where there is danger of stirring up an already present nephritis. There are cases where the deep veins are destroyed from preceding infection or phlebitis, and here there are large varicose veins which extend above the groin and even up to the axilla. In such cases, the time filling test is of no value and these veins should not be interfered with. It is not advisable to treat a recent case of phlebitis, as there is always danger of stirring up the infection and causing a septicemia or pyemia. Similarly, where varicose veins develop in a patient who has had a previous phlegmacia alba dolens, injection treatment should not be given until a long period of time has elapsed. Also, it is not advisable to inject at a time when there is a great amount of edema present in the leg in any case. With elevation of the leg and hot packs, this subsides very rapidly and the treatment can be commenced.

When ulcers complicate the condition, supportive treatment is absolutely essential. The ulcer should be stimulated by the application of silver nitrate, the strength varying according to the depth of the granulation tissue present. A dressing is applied over the ulcer, over which an ordinary rubber bath sponge is placed so as to cover at least one inch beyond the ulcer area. A bandage is applied tightly from the foot upward so as to cause compression over the ulcer area. It may be necessary in painful cases to give the patient a narcotic for relief of pain during the first day or two. After the ulcer is healed, supportive treatment should be carried out for at least a month—either in the form of an A. C. bandage or an Unnas paste cast.

CONCLUSIONS

The danger of complications in the injection treatment of varicose veins is very small and will be less as the technic is improved.

It is a form of treatment that has to be considered more from an economical point of view than any other form of disability or illness with which we have to deal.

Bad sloughs rarely, if ever, occur with proper solutions, good technic and careful attention to details.

The results, both cosmetic and functional, have more than met expectations.

The injection treatment is much less dangerous than the operative treatment and to date gives more permanent cures where complicated by ulcers.

BIBLIOGRAPHY

D'Allaines, F., and Roseau, H.: Ligature of the varicose stumps completing the sclerosing injections in the treatment of varicose veins. La Presse Medicale, 35:825.

Douthwaite: The injection treatment of varicose veins.

Hayes, James: Minn. Med. (April) 1925.

Kampmeier, Otto F., and Birch, Carroll La Fleur: The origin and development of the venous valves, with particular reference to the saphenous district.

Kottmaier, E.: Liuser's treatment for varicose veins and its dermatological value. Dermat. Ztschr., 43:186 (March) 1925.

Kosinski, C.: Observations on the superficial venous system of the lower extremity. Jour. Anat. Vol. 60, 1926.

Linser: Treatment of varicose veins by intravenous injection. Schweiz Med. Wchnschr., 5:2227, 1925.

McPheeters: The injection treatment of varicose veins by the use of sclerosing solutions. Surg., Gyn. and Obst., October, 1927.

Meisen, V.: Injection treatment of varices and their subsequent condition. Ugeskrift for Laeger, 89:47 (January 20) 1927.

Regard, G. L.: The treatment of varicose veins by sclerosis-producing injections. Revue Medicale de la Tuise Romande, 45.

Sicard, J. A., and Gangier, L.: The treatment of varicose veins by sclerosing injections. La Presse Medicale, 34:689 (June 2) 1926.

Unger, E.: The treatment of varicose veins. Zentralbl. f. Chir. Leipzig, 3273 (Dec. 17) 1927.

AN UNUSUAL CASE OF NUTRITIONAL DISTURBANCE, SHOWING SYMPTOMS OF PELLAGRA, OSTEOMALACIA AND TETANY*

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THE combination of pellagra with osteomalacia and tetany, to our knowledge, has not been reported. We hesitate to attribute the simultaneous appearance of the conditions to mere coincidence. A common cause for all suggests itself. Consequently the case described here is also of interest in regard to the theories of etiology of these diseases. For these reasons we feel justified in reporting this clinical observation even though it has not been possible to investigate the mineral metabolism.

REPORT OF CASE

A woman aged thirty-four years, a nun, came to The Mayo Clinic in April, 1928, complaining of weakness, nervousness, an affection of the skin, and difficulty in walking. She had lived in Missouri all her life. Her family history apparently did not have any bearing on her condition at the time of her registration at the clinic in 1928, although one sister was said to have a slight enlargement of the thyroid gland. During childhood she had had whooping cough, measles, scarlet fever, and diphtheria. Since then she had suffered almost every summer from an attack of diarrhea, which had been attributed to fresh fruits and vegetables, especially to new potatoes. The attacks usually had lasted several weeks, but on subsiding she had been able to eat anything she liked, and those foods which supposedly had been the cause of the condition, without any ill effect. In 1909 an itching, vesicular eruption of the skin had occurred at intervals. This was mainly localized in the interdigital folds and on the extensor surfaces of the knees, elbows and shoulders. Heat, diarrhea, and nervousness were all said to aggravate the condition.

Examination of the patient at The Mayo Clinic in 1915 had not disclosed evidence of a lesion of the skin but the patient had complained of generalized pruritus, and it was noted that she had a colloid goiter. After a remission of six years the condition of the skin had recurred at intervals during the following seven years. Fowler's solution had been given with satisfactory results. Dermatologists had classified the eruption as dermatitia herpetiformis.

In 1917 the patient had entered the convent. One other member of her order with whom she had never been associated had died from pellagra. In 1919 intermittent spells of fever (103° to 104°) had occurred and had been of about four weeks' duration. With this history and that of general weakness and susceptibility to colds, tuberculous infection had been suspected and she had been sent to Denver, Colorado. Her weight had continued to decline; from 70 kg. in 1920 it had been reduced to 54 kg. in 1923. Two years later exploratory laparotomy and appendectomy had been performed. The spleen and the right kidney had been found to be enlarged, and the gallbladder, colon, and duodenum covered by adhesions. Some dental extractions had been followed by a few weeks of fever. About this time, or approximately six years previous to her second admission to the Mayo Clinic, she had begun to complain of "drawing pains" which involved the region of the lumbar spine, the pelvis and the right lower part of the thorax. This condition had been associated with tightness of the abdominal muscles which had made it difficult for her to stand in an upright position and which had been noticed first when she attempted to get up from a sitting position. Walking gradually had become difficult, and since January, 1928, she had been obliged to use crutches. During the same six-year period, cramps in the hands and in the feet along with twitching of the eyelids had occurred occasionally. At times symptoms had been coincident with the attacks of diarrhea. In August of 1927 a lesion of the skin had developed, quite different from the earlier lesion. This had consisted of symmetrical, dry, red areas which had appeared in the region of the wrists, elbows, knees, neck, shoulders, groins and external genitalia and was diagnosed as pellagra. Oligomenorrhea had existed for three years and had been followed for the last two years by complete amenorrhea. Urinary frequency had been present during this time.

On admission to the hospital in April, 1928, the patient weighed 43 kg. and her height was 164 cm. (table 1). She could walk only a few steps without the help of crutches. The thorax appeared bent forward and movements of the legs seemed difficult. When she was walking, there was barely any bending at the knees and hips and the feet were dragged along the floor with a jerking motion which started from the pelvis.

The frontal portion of the patient's skull was rather large and was of square shape. A boss was present at the juncture of the two parietal bones. In the tho-

*Work done under the supervision of Dr. Leonard G. Rowntree and Dr. Charles S. McVicar, Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

racic region of the spine there was marked kyphosis and left scoliosis and there was almost no compensatory lordosis in the lumbar area. The right lower portion of the thorax bulged laterally and forward. The curves of the clavicles were slightly exaggerated. There was marked thickening of the chondro-osseous juncture of the right fifth rib and of the tenth and eleventh ribs on both sides. The sternum and the lower ribs were tender to pressure. As a result of the kyphosis of the spine, the costal margins approached the pelvic brim and this allowed the abdominal wall to be retracted in a deep, transverse groove. The symphysis pubis was rather prominent; the acetabula were deepened; the promontorium pushed forward; the sacrum tilted, and the pelvic outlet narrowed. In striking contrast with the bones of the trunk, no change was discovered in the bones of the extremities. Roentgen-ray examination revealed, besides the foregoing deformities, a marked degree of osteoporosis in the bones of the trunk. The sella turcica was of normal dimensions and outlines. Signs of fractures could not be found.

Examination of the skin showed symmetric, well demarcated, dry, red areas over the lateral parts of the neck, in the regions of the groins and external genitalia, over the elbows, on the shoulders, and on the dorsum of the wrists and in the knee pits. Of the vesicular type of skin lesion, described in the history, nothing was noticed on admission. We repeatedly observed that groups of small opaque blisters formed mainly on the arms, and decidedly less frequently on the trunk. Iodine seemed to aggravate the vesicular form of dermatitis, whereas Fowler's solution apparently caused it to disappear.

Examination of the eyes did not reveal any pathologic change. The absence of opacity of the lenses was noteworthy. The teeth seemed well formed and well arranged, but there was considerable pyorrhea. Signs of stomatitis were absent. The tongue was clean, was not very red, and the edges were smooth and atrophic. The tonsils were of medium size and were deeply buried.

The thyroid gland was of a fine nodular type; its left lobe was enlarged approximately to 2 by 2 by 3 cm. Bruits or thrills were not noticed in the region of the thyroid vessels. Except for impure breath sounds over both apexes and a soft, systolic heart murmur in the pulmonic region which was not propagated, general and roentgen-ray examination of the thoracic organs were negative. The pulse was regular, the rate varying from 70 to 106 beats each minute, and the blood pressure ranged from 94 systolic and 68 diastolic to 104 systolic and 78 diastolic. The abdominal wall bore a surgical scar and was retracted in a deep transverse groove, as mentioned. Abnormality of the internal pelvic organs was not found.

Neurologic examination did not reveal any sensory changes. The knee jerks were hyperactive. Chvostek and Trousseau signs were positive and galvanic stimulation of the ulnar nerve showed marked hyperexcitability. The internal hamstring muscles of the left lower extremity were more hypertonic than those of the right.

On proctoscopic examination the mucosa of the rectum appeared normal. Parasites or ova were not found in the stool. Urinalysis showed an occasional faint trace of albumin. Bence-Jones protein, acetone bodies and indican were absent. Other laboratory data may be noted in table 2. The hypocalcemia and the elevation of the basal metabolic rate are important.

While the patient was under our observation she had a few attacks of tetany with typical carpopedal spasms. Injections of calcium chloride and parathormone checked these promptly. We refrained from the prolonged administration of the parathyroid preparation, fearing that it might lead to depletion of the calcium deposits in the bones. Calcium lactate was prescribed in doses of 5 gm. twice daily. Following the suggestion of Roe and Kahn, it was dissolved in water and was given two hours before the first and two hours after the last meal of the day. Ten drops of compound solution of iodine given three times daily reduced the basal metabolic rate to normal within eight days. On discontinuance of this medication, the rate of metabolism returned to its former level. The symmetric abnormal areas on the skin which had existed for only eight months disappeared almost completely. Whether this was the result of the "high vitamine" diet, including cod-liver oil, irradiated ergosterol and yeast, cannot yet be determined.

TABLE 1. MEASUREMENTS

Height	
Vertex of skull to heel, cm	164.0
Vertex of skull to iliac crest, cm	63.0
Iliac crest to heel, cm	101.0
Circumference of thorax	
At level of:	In inspiration. cm. / In expiration, cm.
Armpits	75.5 / 72.5
Breasts	77.0 / 74.0
Seventh rib	79.3 / 77.0
Diameters of thorax	
Anteroposterior level of seventh rib, cm	20.0
Lateral level of seventh rib, cm	25.0
Diameters of pelvis	
Interspinous, cm	22.0
Intercristal, cm.	26.0
Intertrochanteric, cm	28.5
External conjugate, cm	22.0

The diagnosis was pellagra, osteomalacia with tetany, and dermatitis herpetiformis.

COMMENT

The clinical picture of pellagra is characterized by symptoms referable to three systems: to the skin, in the form of a symmetric erythema or dermatitis; to the digestive tract, mainly as stomatitis and diarrhea; and to the nervous system, as nervous and mental changes.[37] The disease is more prevalent in warmer climates than elsewhere. Seasonal variations are definite; exacerbations come in spring and fall.

The dermatitis which affected the neck, shoulders, elbows, wrists, groins, and knees of the patient reported here was indicative of pellagra,

whereas the asymmetric vesicular type of skin eruption was considered by the dermatologists at the clinic to be evidence of dermatitis herpetiformis.

Although there were numerous indications substantiating the diagnosis of pellagra on the basis of skin symptoms, diarrhea was the only symptom referable to the digestive tract. It had been present intermittently for more than twenty years before the pellagrinous lesions of the skin developed. However, stomatitis, increased salivation and anacidity were absent. The nervous symptoms were exaggeration of tendon reflexes and cramps; these are not uncommon in pellagra.[35] Mental or sensory changes were absent. Concerning the rise in metabolic rate, the only records of the basal metabolism in pellagra which we were able to find, showed a considerable elevation in rate in four out of six cases.[16] Pellagra is not responsible, to our knowledge, for deformities of bone.

The etiology of the disease is still unknown. Since the time when Casal first described it in 1762, its cause has been attributed to faulty food. For many years, the excessive use of maize, the formation of a toxin from the mould of this plant or the removal of substances from maize by certain methods of preparation, was thought to be the cause of pellagra. But with the widespread appearance of the disease in North America in the first decade of the twentieth century, the investigators abandoned the theories in which maize was concerned and centered their interests on the question of infection,[33] and deficiency of food.[10] The latter view perhaps has had more experimental support, although we do not yet know whether the deficiency lies more in an inadequacy of the supply of protein, of mineral or of vitamin.

The pathologic process which underlies osteoporosis is decalcification of bone tissue, which ultimately leads to atrophy and to weakness of the skeleton. Clinically, this becomes manifest by increased fragility, as illustrated by fractures, or by deformation of bones. Osteomalacia, on the other hand, shows histologically not only decalcification but, at least in adults, formation of osteoid substance.[17] The softening of the bones is more marked than is the increase in their fragility; consequently deformities appear more frequently than fractures, and usually they appear earlier. The disease also is not limited to skeletal changes. The question whether osteomalacia and adult rickets are indentical conditions is still under discussion.[6, 7, 11, 23]

Osteomalacia affects women mostly; rarely, it affects men. It is characterized, clinically, by pain, muscular weakness, and bone deformities. Pain occurs at first only on pressure; particularly is this true of the lateral parts of the thorax and the spine. Later movements become painful, and finally spontaneous pain localizes, usually symmetrically, in the lumbar and sacral spine. Weakness of the ileopsoas muscles, with contractures of the adductors of the thigh and pressure pains of the bones, are helpful as a diagnosis triad before the occurrence of deformity of the bones.[19, 25] Deformity involves, in adults, mainly the bones of the pelvis, the spine, and thorax; in younger persons, not only these but also the bones of the lower extremities are affected. The deformity of the pelvis is generally detected because of its function in relation to pregnancy. The changes in the thorax are characterized by shortening of the transverse and lengthening of the anteroposterior diameters. The vertebræ become flattened; kyphoscoliosis develops in the spine; the abdominal wall is drawn in and a transverse groove forms which is typical of the disease. The "duck-gait" of osteomalacia is considered a result of tenderness, deformity, muscular weakness, and disturbance in innervation of the muscles. Scott described it as a mixture of jerking, waddling and shuffling. The calcium content of the blood is decreased, and normal or subnormal values are found for the alkali reserve and for blood phosphorus. In the active stages of the disease, the calcium output exceeds the calcium intake,[21, 22] and the content of calcium and phosphate in osteomalacic bones is very low.

Osteomalacia is frequently associated with active or latent tetany. According to György, this association occurs in 20 to 70 per cent of the cases. In regard to the etiology of osteomalacia, medical literature abounds in theories,[30] but a few have gained especial recognition. For example, abnormalities of almost all of the known endocrine glands have been suspected as the cause of this condition. The long-discussed ovarian theory of osteomalacia fell into disrepute only after repeated experiments with a large number of patients.[11, 20, 21] The relation of hyperthyroidism, hypocalcemia and bone changes fre-

TABLE 2. LABORATORY DATA

Date	Blood chemistry: Calcium, mg. per cent	Blood chemistry: Phosphorus, mg. per cent	Blood chemistry: Chlorides, mg. per cent	Blood chemistry: Urea, mg. per cent	Carbon dioxid combining power, per cent	Acid hematin, per cent	Hemoglobin, per cent	Erythrocytes	Leukocytes
4-20							54	4,090,000	8400
5-11	6.30	4.5							
5-14	6.20	4.4							
5-18	5.53		631						
5-19	6.35			16					
5-21	6.25								
5-22	6.59		629						
5-23	6.99								
5-24	6.48								
5-25	6.43								
5-26	7.58								
5-28	7.53						60	4,750,000	
5-29	7.18	4.5							
5-30	7.28								
5-31	6.69								
6- 1	6.49								
6- 2	6.49								
6- 5	6.95								
6- 6	6.67								
6- 7	7.09						48	4,270,000	
6- 8	7.46								
6- 9	7.13		623						
6-16	7.26	2.3					39	3,960,000	
6-25	6.10						48	4,150,000	
7- 7	8.30						55	3,840,000	6500
7-10	7.20	3.8							
7-13	7.70								
7-20	7.30	2.9							
7-30	7.50								
8- 6					42	9.5	46	2,970,000	5500
8-13	6.40	4.3							
8-16	6.70	5.3							
9-20	7.80	3.4			48		55	3,370,000	2700

April 20, test meal: total acids 38, free hydrochloric acid 18, amount 35 c.c.

Basal metabolic rate:

May						August		September						
18	19	22	26	28	29	28	29	1	3	5	7	16	17	19
+17	+31	+18	+32	+28	+29	+33	+31	+28	+16	0	+7	+18	+27	+25

Differential blood count:

	July 7	August 6	September 20
Lymphocytes, per cent	41	24	31.5
Large mononuclear leukocytes, per cent	0	0	1.0
Transitionals, per cent	2	1	1.5
Neutrophils, per cent	54	70	64.0
Eosinophils, per cent	3	5	2.0

Coagulation time (Lee), five minutes three seconds. Treatment by calcium from May 20 to September 22. Treatment by parathormone from May 20 to June 2; June 7 to June 9, and on June 23. Compound solution of iodine given from August 29 to September 6.

quently has been discussed[2, 15, 18, 24, 36] and the thyroid origin of osteomalacia was postulated.[14] In the light of more recent investigation, participation of the thyroid in osteomalacia appears doubtful, but the coincidence of this condition and goiter is surprisingly frequent.[1, 3, 13, 29] The climatic and dietary theories, as borne out in numerous cases in India and China, would seem to be the nearest to the real crux of the yet undetermined cause. Osteomalacia, either with or without tetany, is unusually common in India[11, 28] and China.[21] In both countries the disease flourishes among those people who are undernourished and who live in close, dark, unventilated quarters; therefore, in discussing etiology, nutrition and general hygiene receive much atten-

tion. But, especially in India, the women who are compelled to follow the purdah system, which keeps them almost constantly confined within doors, are victims of the disease. In China it is most common among the women of the middle class who are too proud to work and are too poor to feed themselves adequately. The people who are still poorer, and are obliged to work outdoors, are not affected. Renewed interest arose when osteomalacia appeared in the larger cities of Austria and Germany during the World War.[1, 12, 13, 27] With these observations on record the conclusion has now been reached that insufficient supply of food, possibly combined with lack of light, are the chief, if not the only, causes of the disease. As therapeutic measures, cod liver oil with calcium and light, as well as phosphorus,[1] irradiated ergosterol,[12, 32] olive oil and strontium[1] are enthusiastically recommended.[12, 13] According to Flamini, cod-liver oil activates metabolism of calcium, particularly diffusion of calcium, through the intestinal wall. Miles and Chih-Tung Feng found that calcium alone did not alleviate the disease, whereas cod-liver oil alone, or combined with calcium, led to rapid improvement.

The coincidence of pellagra and osteomalacia with tetany in one person is not so surprising if one assumes a nutritional deficiency as the cause of both conditions. However, although we believe that the clinical picture presented by this particular case can be explained on the basis of a nutritional disturbance, we do not know which element of food is lacking. Repeated attempts to trace a deficiency in the patient's diet failed. However, one month after the institution of a high-calorie and vitamin-rich diet, our patient menstruated and she has continued to menstruate at regular intervals ever since. For the two previous years she had not menstruated.

The patient gave a history of good hygienic conditions and of much time spent in the open air. Incidentally, however, the costume which she wore allowed, as indicated by spectrophotometric measurements, less than 1 per cent of the total spectrum to penetrate the dark material. Whether this fact has any bearing on the patient's condition is not known.

Theoretical considerations induced a search for a gastro-intestinal disorder which might interfere with resorption and which might cause these symptoms in spite of a sufficient and well-balanced diet. Conclusive evidence of such a lesion was not found. Likewise, for theoretic reasons, the possibility of an endocrine disturbance, which might hinder the normal utilization of food, had to be considered.

In a few cases of osteomalacia with tetany, changes have been found in the parathyroid glands.[8, 29, 34] Most frequently histologic evidence of parathyroid disease is lacking, but there is still the possibility in this disease of functional disorder of this gland.[12]

The elevated basal metabolic rate, the mild intolerance for heat, and the slight enlargement of the thyroid suggested thyroid disease. Its relation to osteomalacia has been referred to earlier in the paper. The administration of iodine solution promptly reduced the basal metabolic rate to a normal level, but it had no influence on the diarrhea. Upon discontinuing the iodine solution the rate again returned to the previous level. Clinical evidence, however, is so scant that we do not feel justified in making a diagnosis of hyperthyroidism.

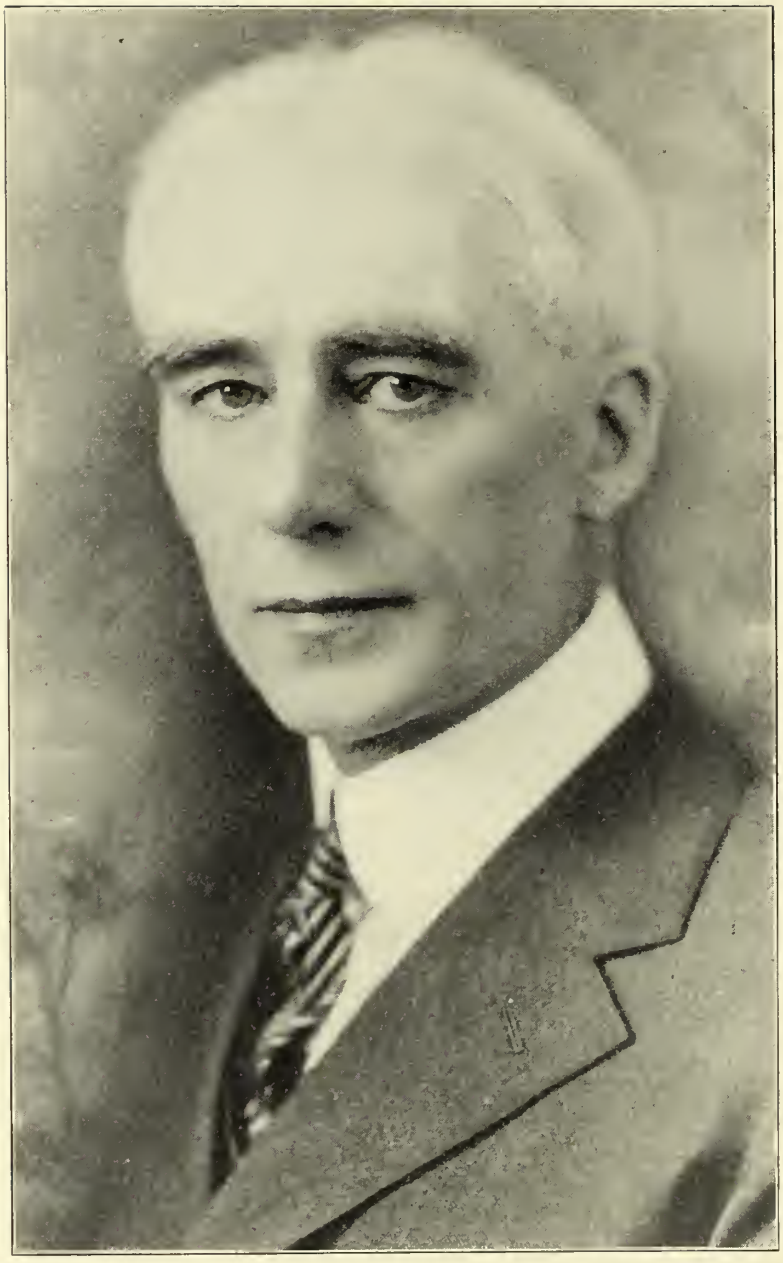
Physical or roentgenologic evidences of disorder of the pituitary gland or of the thymus were not found. Simmond's cachexia did not seem to explain the clinical picture, and there were no signs to prove suprarenal insufficiency.[5] It has become almost a fashion to cover ignorance by attributing every disorder to pluriglandular deficiency. According to Alwens, insufficient nutrition leads to pluriglandular disturbance, but theoretically the inverse process may also be possible.

The unusual clinical picture in this case seems best described as a combination of the syndromes of pellagra, osteomalacia and tetany. It is probably a nutritional disturbance, the cause of which is not known. Deficient supply of food or light, a hormone disturbance, or a gastro-intestinal lesion are possible pathogenetic factors.

BIBLIOGRAPHY

1. Alwens: Ueber die Beziehung der Unterernährung zur Osteoporose und Osteomalazie. München. med. Wchnschr., 1919, lxvi, 1071-1075.
2. Aub, J. C., Bauer, W., and others: Relation of thyroid gland to calcium metabolism. Tr. Assn. Am. Phys., 1927, xlii, 344.
3. Bernhard: Ueber einen Fall von Osteomalazie. München. med. Wchnschr., 1927, lxxiv, 432.
4. Bernhardt, Hermann: Ein Beitrag zur nichtpuerperalen Osteomalazie. Deutsch. med. Wchnschr., 1927, liii, 1082-1083.

5. Bossi, L. M.: Nebennieren und Osteomalacie. Zentralbl. f. Gynäk., 1907, xxxi, 69-70.
6. Christaller: Vergleichend-Pathologisches zur Rachitis, Osteomalazie und Ostitis fibrosa. Deutsch. med. Wchnschr., 1920, xlvi, 930.
7. Dwyer, H. L., and Eckelberry, O. S.: Osteomalacia in children: a study in mineral metabolism. Am. Jour. Dis. Child., 1926, xxxi, 639-653.
8. Erdheim: Quoted by György.
9. Flamini, Marco: The action of the antirachitic vitamin of cod-liver oil on the organism of the child. Chem. Abstr., 1927, xxi, 438.
10. Goldberger, Joseph: Pellagra, In: Tice, Frederick: Practice of medicine. Hagerstown, Pryor, 1923, ix, pp. 205-234.
11. Green-Armytage, V. B.: Osteomalacia, its early recognition, modern prevention, and treatment (a three years' "follow up" of 69 private cases). Indian Med. Gaz., 1928, lxiii, 357-361.
12. György, P.: Osteomalacie und die "idiopathische" Tetanie der Erwachsens. In: Stepp, W. von, and György, P.: Avitaminosen und verwandte Krankheitszustände. Berlin, Julius Springer, 1927, pp. 378-402.
13. Hecker: Ueber das gehäufte Vorkommen von Erkrankungen des Knockensystemes. München. med. Wchnschr., 1920, lxvii, 856-857.
14. Hoennicke, Ernst: Zur Theorie der Osteomalacie, zugleich zur Lehre von den Krankheiten der Schilddrüse. Berl. klin. Wchnschr., 1904, xli, 1154-1156. Ein Kaninchen mit experimenteller puerperaler Osteomalacie. Deutsch. med. Wchnschr., 1906, xxxii, 166-167.
15. Jaksch, R. von, and Rotky, H.: Ueber eigenartige Knochenveränderungen im Verlaufe des Morbus Basedowii. Fortschr. a. d. Geb. d. Röntgenstrahlen, 1908-1909, xiii, 1-21.
Nachtrag aur Mittelung: "Ueber eigenartige Knochenveränderungen im Verlaufe des Morbus Basedowii." Fortschr. a. d. Geb. d. Röntgenstrahlen, 1910, xv, 359-363.
16. Jones, H. P.: A demonstration of the technic followed in the determination of the basal metabolic rate, indirect method using the Benedict portable unit. New Orleans Med. and Surg. Jour., 1921, lxxiii, 262-271.
17. Kaufmann, Eduard: Lehrbuch der speziellen pathologischen Anatomie. Ed. 7 and 8, Berlin, Gruyter, 1922, 1722 pp.
18. Koeppen: Ueber Knochenerkrankungen bei Morbus Basedowii. Neurol. Zentralbl., 1892, xi, 219-220.
19. Latzko: Quoted by György.
20. McCrudden, F. H.: Studies of bone metabolism, especially the pathological process, etiology and treatment of osteomalacia. Arch. Int. Med., 1910, v, 596-630.
21. Maxwell, J. P., and Miles, L. M.: Osteomalacia in China. Jour. Obst. and Gynec. Brit. Emp., 1925, xxxii, 433-473.
22. Miles, L. M., and Chih-Tung Feng: Calcium and phosphorus metabolism in osteomalacia. Jour. Exper. Med., 1925, xli, 137-157.
23. Naegeli: Ueber die Bedeutung des Knochenmarks und der Blutbefunde für die Pathogenese der Osteomalazie. München med. Wchnschr., 1918, lxv, 551-556.
24. Revillod: Thyreoidismus. Cor.-Bl. f. schweiz. Aerzte, 1895, 400-401.
25. Rissmann: Quoted by György.
26. Roe, J. H., and Kahn, B. S.: Absorption of calcium from the intestinal tract of human subjects. Jour. Am. Med. Assn., 1927, lxxxviii, 980-984.
27. Sauer, Hans: Ein Fall von Hungerosteomalazie und Tetanie. Deutsch. med. Wchnschr., 1920, xlvi, 45-47.
28. Scott, Agnes C.: A contribution to the study of osteomalacia in India. Indian Jour. Med. Research, 1916-1917, iv, 140-168. The calcium content of urine and blood with special reference to its variation in the condition of osteomalacia. Indian Jour. Med. Res., 1916-1917, iv, 169-182.
29. Schmorl: Demonstration von zwei Fällen von Hungerosteomalazie. München. med. Wchnschr., 1920, lxvii, 1277.
30. Silberberg, Martin: Pathologie und Pathogenese der osteomalazischen Knochen-Systemerkrankung, unter Berücksichtigung der Erfahrungen am hungernden Menschen. Ergebn. d. allg. Path. u. Anat., 1923, xx, 306-343.
31. Simmonds, M.: Atrophie des Hypophysisvorderlappens und hypophysäre Kachexie. Deutsch. med. Wchnschr., 1918, xlix, 852-854.
32. Starlinger, W.: Ueber die Beeinflussung des Verlaufes einer schweren Osteomalacie durch bestrahltes Ergosterin. Deutsch. med. Wchnschr., 1927, liii, 1553-1554.
33. Thompson-McFadden Pellagra Commission: Quoted by Wood, E. J.: Pellagra. In: Osler's Modern medicine. Philadelphia, Lea and Febriger, 1925, ii, p. 788.
34. Trémolières, F., Olivier, H., Huguenin and Héraux: Sur un cas d'ostéomalacie accompagné de lésions chroniques du corps thyroide et d'adénomes parathyroidiens. Jour méd. franç., 1925, xiv, 382-385.
35. Tucker, B. R.: Pellagra in its relation to neurology and psychiatry. Am. Jour. Med. Sc., 1912, cxliii, 332-339.
36. Waldorp: Contenido cálcico de la sangre en el hombre y su regulacion por las glándulas de secrecion interna en condiciones normales y pathologica. Prenza méd. Argentina, 1926, xii, 1173; 1216.
37. Wood, E. J.: Pellagra. In: Oxford Medicine. London, Oxford University Press, 1920, iv, 307-352. Pellagra. In: Osler's modern medicine. Philadelphia, Lea and Febiger, 1925, ii, 783-800.



J. T. CHRISTISON, M.D.
President, Minnesota State Medical Association

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THE FLOP

Have you ever encountered a "flop"? Perhaps you have and didn't recognize it. It might be well for members of the medical profession, especially those employed by insurance companies in industrial compensation cases, to be on the lookout for flops for quite a bevy has recently been uncovered in New York.*

A flop is a professional petty crook who makes a business of getting into accidents in order to collect disability insurance. The flop is employed or abetted by a crooked lawyer to scout around through certain parts of the city for such openings or defects best suited for feigning injury, such as an open cellar door, a broken step or a defective manhole. The flop would then take his flop and feign injury and an accomplice would be at hand to render assistance, call the police, get the names of witnesses and take care of the presumably injured flop, for as a rule he would refuse to be taken to the hospital, where the fake might be more readily detected.

According to the investigation recently made in New York City one flop took as many as one hundred flops in a little more than a month and as high as eight in one day, necessitating two ambulance calls.

Fake automobile accidents were employed, the driver assuming the responsibility to assure more prompt settlement. A collision between an automobile and a street car would offer an unusually good opportunity for inducing a number of persons to pose as victims. In each case the lawyer would furnish most of the story.

No difficulty seemed to be encountered in obtaining a crooked doctor to furnish medical reports on the supposed injury. The doctor might prepare as many as ten certificates at a sitting at two dollars each from information obtained perhaps over the telephone. Examination by the physician for the insurance company did not serve to cripple the fraudulent schemes as sufficient excuses for delay could be made to defer such examination until a time when the supposedly injured individual should be recovered.

We suspect that the policy of some insurance companies made such an undertaking possible. It was doubtless cheaper to settle a small claim without too extensive an investigation. That advantage should have been taken of such a policy to frame up small claims by the wholesale proved an unexpected revelation.

*Cooper, Irving Ben: Barter and Sale of Patients and Clients. The Panel, October–November, 1928.

OLD AGE

Since earliest times man has attempted to avoid or postpone the period of old age with its

shadows of inactivity, dependence and impending death. To the medical profession belongs the credit of lengthening the average life anywhere from one to ten years but it is a question whether this has postponed or merely lengthened the period of old age. Present styles of manners as well as of dress make for the illusion of youth, and age can be disguised more than ever before. At the same time more education and longer training periods are constantly raising the age of economic independence while modern high pressure business efficiency demands an earlier retirement age, thus materially shortening the productive years.

Then arises the question of what to do with these extra years that are being conferred upon men and women. Since the medical profession is largely responsible for them it becomes partly their problem. The first attempt at solution was a recent conference upon old age held by the New York Academy of Medicine and attended by physicians from all over the country. So important did this seem to the lay world that the popular news magazine "Time" (Oct. 22, 1928), carried a detailed description of the conference and reported that it presented much of different diseases but very little of the general hygiene of old age.

The diseases of senility are important but yet more important is a consideration of the factors which would make old age a time of contentment and happiness instead of dependence and disillusionment. The point of economic independence has been well stressed but does not solve the whole problem, for a rich old person is not always a happy one. William Vaughan (A Doctor's Memories) says that each man meets old age as either a fool or a philosopher and that the latter accepts the limitations as well as the privileges of each age and further says, "For myself the pleasure of living has grown." Carl Ramus (Outwitting Middle Age) feels that senility can be avoided or postponed by eating light food and "thinking young thoughts." Logan Clendenning (The Human Body) feels that periodic health examinations upon apparently normal old people do more harm than good by limiting their activities and making them self centered and apprehensive so that their extra years bring them little of either pleasure or comfort. Maurice Duplay (Our Doctors) emphasizes the importance of interest in the activities of other people and says, "One gets so much pleasure from just looking." Our own Dr. Sweeney (Minnesota Medicine, October, 1928) advised the cultivation of more interests during the formative or plastic years of life, thus preventing the "one track mind" which has no resources after the main ambition has been accomplished.

There is no doubt that physiological old age is very different from chronological old age and each case must be considered by itself; but the fact remains that if the last years of life are to be pleasurable or profitable the problem must be studied from a psychological as well as a physical point of view. Years of saving, during the productive years, for the dependent years has been preached but nothing is ever said of preparation for the mental life during the dependent years. Interest in living is just as important as financial independence and the art of living must be learned during the early formative years if the declining years are to be enrichened. Many physicians have developed avocations which, after active practice is over, proved to be either lucrative or interesting or both and resulted in distinct contributions to the knowledge of the world. The man who has the trait (often acquired) of making friends, who finds comfort in books or pleasure in music, who has an active interest in the affairs of the world, who is vitally interested in people and their doings, who has a philosophic mind which enables him to change his interest and activities with the changing years, and, best of all, who has a beloved hobby or avocation, has little to fear from old age.

Margaret Warwick, M.D.

W. H. EUSTIS

The life of Mr. W. H. Eustis demands the attention of the medical profession. The generosity of the former mayor of Minneapolis laid the foundation for medical activities which in the years to come will do an immeasurable amount of good to a multitude of crippled children throughout the state. A cripple himself, he realized better than anyone not so afflicted the handicap a crippled child has in the struggle of modern day life. The wealth that he accumulated as a re-

sult of keen business judgment has been given *in toto* to furnish medical and surgical aid to crippled children. The term cripple is used in a broad sense to cover not only those children crippled through bone and joint disease but those handicapped in any way through accident or disease.

More than five years ago a tract of land on the bank of the Mississippi river was given to the state as a site for a convalescent home for needy crippled children and the adjoining property where the Michael Dowling school now stands was also donated. Mr. Eustis' entire fortune of a million and a half has been bequeathed to build and endow the hospital, which will be known as the Minnesota Hospital and Home for Crippled Children.

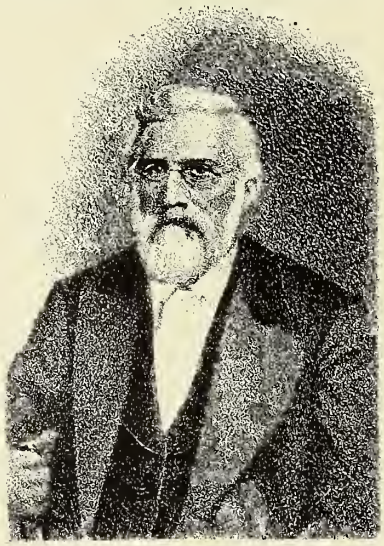
Mr. Eustis was born in the village of Oxboro, New York, July 17, 1845, of English parentage. He died in Minneapolis November 29, 1928, at the age of eighty-three. Robust as a child, a crippling accident at the age of fifteen forced a complete change in his life. The difficulty he encountered in obtaining proper medical advice and the obstacles met in obtaining an education resulted in his decision to devote his wealth to assist others similarly handicapped.

His generosity is an inspiration in an age when wealth is so commonly thought to be an end in itself. How much better to be remembered by posterity in this manner than, for instance, by a building towering above all others, desirable as a skyscraper may be.

The generosity of wealthy individuals, notably in the eastern part of our country where there is more concentration of the country's wealth, has been responsible for much alleviation through medical agencies of human ills. The widespread generosity of not only our millionaires but the well-to-do in general is an outstanding justification of the institution of private property. The fine example of Mr. Eustis merits emulation.

HISTORICAL COMMITTEE

We present this month a portrait of the first physician to locate in Minnesota for the practice of his profession. Army surgeons were stationed at Fort Snelling, or Fort St. Anthony as it was called in those days, at its establishment in 1819, and medical missionaries came to Minnesota in 1835. Our country was then part of Michigan or Iowa territory. The portrait above is that of



Christopher Carli

Dr. Christopher Carli of Stillwater. Dr. Carli came to Stillwater in 1841, and lived there until the time of his death in 1887. Who was the first physician in your town? When did he come there?

Next month we shall tell you another—how a physician by bringing his property to Minnesota started something that was a contributing cause of the Civil War. Now you tell us one. Send it to Dr. H. M. Workman, Tracy, Minn., Secretary of the Historical Committee, Minnesota State Medical Association.

J. M. A.

President's Letter

THE accomplishments of the year 1928 are now history. Great as they have been we trust the year 1929 may show as great or if possible greater progress. Let us, every one, begin the year with a determination to do at least some one thing to keep the spirit of scientific medicine moving ever onward and upward. A good slogan to start the year is "No diphtheria in Minnesota in 1930." The activities of Dr. Pierce's committee and their plans for a state-wide toxin-antitoxin program should appeal with a great deal of force to every member of the State Association. It is a foregone conclusion that if this more than worth while endeavor to stamp out this dread disease by a method at once so simple and so devoid of untoward results is not taken in hand seriously by our profession, it will be promoted by some of the many lay health organizations spreading in the State. These organizations are certainly not in a position to push a campaign of this nature to a successful conclusion in any such degree as a united medical profession.

May I in this, my initial message, bespeak your hearty cooperation for this most worthy project.

MISCELLANEOUS

DR. C. LEVADITI VISITS NORTHWEST

The Twin Cities and the Northwest were privileged to have the pleasure of a visit from Dr. C. Levaditi of the Pasteur Institute, Paris, France, eminent scientist, known throughout the entire medical world for his many noted researches and discoveries in medicine.

C. Levaditi

Dr. Levaditi came to the United States on a scientific mission, visiting the Mayo foundation at Rochester, where he did some work in collaboration with Doctor Edward C. Rosenow of the Mayo foundation. He also delivered lectures at Harvard University, University of Michigan, and a few other leading medical centers, including a visit to the University of Minnesota bacteriological laboratories. He remained in Minneapolis a few days as guest of Mr. George G. Ulmer of the Physicians and Hospitals Supply Company.

Dr. Levaditi is internationally known for his many researches, and particularly his development of a new bismuth cure for syphilis. He was the first to use bismuth compounds in oil suspension for the successful cure of this disease. The extent and completeness of his work is evidenced in the works published by himself and edited by Masson and Company, Paris, France, under the heading "Bismuth in the Treatment of Syphilis." Since the publication of these works, Dr. Levaditi has developed a new and improved bismuth compound which is claimed by many authorities to be more efficient than present known remedies in a great many cases. This product has been effectively demonstrated to cure syphilis in various stages, and properly used has no toxic effect.

Among some of his other works are the determination of the filtrable virus of infantile paralysis, the staining of syphilitic spirochetes on slides, researches on lethargic encephalitis.

His latest honor in the medical world was the recent award of the Cameron prize.

Among the many scientific bodies of which he is a member is the French Academy of Medicine.

Dr. Levaditi was greatly impressed by the research work being carried on at the University of Minnesota, and the Mayo Foundation. He was exceedingly impressed with the extensive development of the Northwest in both scientific and business activities and enjoyed the beautiful scenery and the kind hospitality evidenced everywhere.

THE WRITING OF MEDICAL PAPERS

ABSTRACT OF MAYO FOUNDATION LECTURE
BY
DR. MORRIS FISHBEIN

Dr. Fishbein said that the history of medical writing is as old as medicine itself, inasmuch as the first man who made an observation he thought was important recorded it. Medical men have always been interested in literature; the first daily newspaper was founded by a physician and the first city directory was published through the stimulus of a physician.

The first great medical journal was the *London Lancet,* instituted in 1823. Following that, in this country the *Boston Medical and Surgical Journal* was founded in 1828. Twenty years later Oliver Wendell Holmes pointed out that the medical literature of this country was largely copied from the English and that the portion which was original was uncouth. In his time there were twenty medical journals in this country; today there are 265.

The manuscripts making the bulk of the content are papers prepared by physicians to read before medical societies and serve the double purpose of education and legitimate advertising. Therefore the writing of medical papers goes on as a business and profession for the purpose of informing men as to what is happening and also who are available for certain operations.

Dr. Fishbein said that men are anxious to have papers published in the good journals as it is considered a sort of award of merit. The reasons why they fail are simple reasons. The first reason often is that the man has not kept in mind the nature of the publication to which the article is to be sent. The first thing an author ought to do in selecting a medium for publication is to consider the nature of the medium and the relation of his article to it.

The second reason for failure is that the author has been too hasty in assembling his material for publication. Manuscripts are being returned constantly because the author has not completed the work but has rushed into print with observations which are, in every sense of the word, preliminary reports.

The third reason is that manuscripts prepared in the first place to be read before medical societies have not been re-prepared for publication. It is safe to say that a manuscript prepared with the idea in mind of reading it is not fit for publication. It is possible for a man through personality to hold an audience while he digresses; the reader of a periodical is not likely to spend time looking over anything but new material given in a brief form. He wants conclusions at the end and a summary so that the information may be digested rapidly.

Often material has not been assembled with the same systematic care that is used in surgical procedures. Dr. Fishbein is convinced that many physicians write papers in this manner: The doctor asks his secretary to get out so many references; he put them aside and asks her to get out a certain number of case reports in that particular field. These are gradually assembled and

then some evening he tells his wife that he will stay home from the movies and get to work on the paper, two days before he has promised to have it ready. He fills in some references and ends with copies of the case records, just as the notes were taken by him when he saw the patient.

There is another style adopted by the man anxious to make his presentation dramatic; he has heard that the reader's interest must be captured immediately. Dr. Fishbein read a ludicrous example of this style. Another man wished to show that he was well read and started his paper, "After a search of the literature I can't find. . . ."

Probably the best rule of style to follow in publications is to recognize certain fundamental facts in the presentation of scientific material. Scientific material does not demand embroidery or ornamentation: it demands first of all presentation of fact. The important factor is to get down the facts important in making a decision, and it is just as important that all facts which have no bearing on the case be left out. The manner of excluding data in reporting postmortem examinations is a question of the greatest importance in submitting manuscript. It can be taken for granted that when a man makes a postmortem examination he will carefully observe all lesions and will know when certain observations are of significance.

The case report is the basis of all medical literature. Dr. Fishbein said that the case report as it appeared in American medical literature between 1890 and 1910 was probably the worst example of medical writing. It started out with a long case number, the initials of the patient, and so forth and these locutions came to be so common that one lost all interest in reading the reports of cases. Dr. Fishbein recommended for comparison the writing of Sir William Osler. The modern form of recording cases in clinic and hospital, as taught to many interns, is telegraphic form. It involves phrases instead of sentences and the use of abbreviations which no one outside can interpret. In one paper L. L. L. N. R. was discovered to mean "left lower lobe no râles." Any manuscript received by the *Journal of the American Medical Association* with a considerable number of abbreviations is returned.

The average author who sits down to write thinks first of a title; the good author looks over the paper after it is finished and then puts down the title. The matter of titles has given pause to all because medical literature depends for its permanence on its indexing. Indexers are not all trained to read the article through and are likely to take the titles. Titles which do not indicate the subject matter and titles which are too long are equally bad. It is also important to know the author's name. Few medical authors adopt a name and stick to it; it is difficult to place the man who one time writes his name with two initials and the next, perhaps, uses the first name and middle initial.

Dr. Fishbein believes that the worst phase of medical writing today is the use of medical jargon or slang. Although doctors say that they cystoscoped the patient he is glad that they do not yet say that they microscoped a slide. He thought that the physician is likely to make a great many mistakes unless he defines the terms he is using. He deplored the horrible errors in taste represented in such statements as, "A surgeon may be a whiz in the abdomen but a bull in the china shop when it comes to the tonsils."

Another common fault is the use of fancy writing employed mostly in the essay form.

The worst offenders in medical writing today are the neurologists, according to Dr. Fishbein: they have worked out a language exclusively their own. "The Freudians have a vocabulary and nothing else." The neurologists make use of a great number of eponyms which may mean a great deal to them and which, to a certain extent, may be permissible in a neurologic publication; but when they are writing for the general practitioner it is necessary to modify the vocabulary. Dr. Fishbein contrasted such writing with Parkinson's simple description of shaking palsy, which he suggested would probably stand a great deal longer. He also depreciated the jargon of the surgical clinic which involves the use of such terms as "acute abdomen."

Dr. Fishbein said that although it is proper in a monograph to give a complete résumé of the literature up to that time, it is preferable even then to give a résumé only back to the last general résumé which has been given well. The scheme of writing should be to state the premise, set forth observations (leaving out everything which has not a direct bearing), then give a brief summary of what is being added to the literature that was not there before. Dr. Fishbein classed notes of thanks as an abomination.—*Proceedings of Staff Meeting of the Mayo Clinic,* May 16, 1928.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

State vs. M. Gabrielson

The above defendant, M. Gabrielson, has been maintaining an office at 4159 Washington Avenue, North, in the city of Minneapolis, Minn., for the past eight years. He has in the past been listed in the Minneapolis telephone directory as a physician and surgeon. The sign on the door at the above address reads: "Dr. M. Gabrielson—Rheumatism Specialist," and his statements sent to patients indicate that he treats all chronic diseases. Gabrielson is not licensed in this state under any of the healing arts.

After investigation a complaint was filed against Gabrielson for treating one Andrew Carlson of Minneapolis. Carlson had been troubled with a skin eruption on his leg and he went to Gabrielson for treatment; the treatment consisted of a liquid application to the disturbed area over a period of nine months with no resulting improvement; during this period Carlson persuaded his brother-in-law, C. O. Swenson of Minneapolis, to go to Gabrielson for treatment for a like ailment. Both of these patients are working in woodworking factories, and probably had some occupational ailment.

On Oct. 17, 1928, the defendant was brought into the Municipal Court of Minneapolis and entered a plea of not guilty. A hearing was set for October 31, but a

day or two before the date of the hearing we were informed that the defendant would waive his preliminary hearing, which he did, and was bound over to the district court. On November 1, the defendant entered a plea of not guilty in the district court and his trial was set for the seventh day of November. On November 7, however, the defendant entered a plea of guilty and the court continued the case until the tenth for sentence. The case was then continued from the tenth to the seventeenth; from the seventeenth to the nineteenth; from the nineteenth to the twentieth and finally on November 21, 1928, the defendant appeared in court for sentence.

The court sentenced the defendant to one year in the Minneapolis workhouse; ordered the defendant to serve 15 days of his sentence and if during the 15 days the defendant can make up his mind to close his place and keep it closed, the court will entertain an application for a suspension of the balance of the jail sentence and place the defendant on probation, on condition that his place is kept closed and that he refrain from practicing healing.

Judge Wm. C. Leary was on the bench in the disposition of this matter.

We have taken up with the telephone company the removal of Gabrielson's name from the listing of physicians and surgeons in the telephone directory and we are informed that the same would not appear in the new directory of Jan. 1, 1929.

A. E. Comstock, M.D.,
Secretary.

OBITUARY

Willard B. Pineo*
1858–1928

Dr. Willard B. Pineo, a resident of Minneapolis for 45 years, died Nov. 13, 1928, after an illness of six months. Funeral services were in charge of the Scottish Rite, of which order he was a member.

Dr. Pineo was born April 22, 1858, in Columbia Falls, Maine, and his preliminary education was received at Bucksport Seminary and Kent's Hill seminary in Maine. He came to Minneapolis in 1883 and after teaching school for six years he took up the study of medicine with Dr. F. A. Dunsmoor of Minneapolis, graduating from the Medical Department of the University of Minnesota in 1885, a member of the first medical class to go out from that institution and, prior to his death, the oldest alumnus.

Dr. Pineo pursued post-graduate studies in New York, Vienna, Paris and London. After five years in general practice, he took up the specialty of Eye, Ear, Nose and Throat, which he continued for 33 years.

Dr. Pineo was a Fellow of the American Medical Association and a member of Minnesota State Medical Association and of the Hennepin County Medical Society, having been secretary of the latter society in 1897-99 at the time when its meetings were held at the Public Library. He was also a member of the Academy of Ophthalmology, and had been a member of the Minneapolis City Hospital Staff and Secretary of the Asbury Hospital Medical Staff for many years. He was a 33 degree Mason, Past Master of Hennepin Lodge No. 4, and Wise Master of Rose Croix. He was a member of the Minneapolis and Lafayette Clubs.

He is survived by his wife. Dr. and Mrs. Pineo had resided for several years at the Leamington Hotel.

*Report of the Necrology Committee, read before the Hennepin County Medical Society at its meeting of December 3, 1928.

Theodore Tennyson*
1869–1928

Dr. Theodore Tennyson died in Los Angeles, California, Oct. 29, 1928. Burial took place at Lakewood Cemetery, Minneapolis, November 5, with members of the Scottish Rite in charge.

Dr. Tennyson was born at Haugesund, Norway, June 30, 1869, and came to Minneapolis with his mother in 1883. He learned the English language and studied pharmacy, engaging in business in Tacoma, Washington, after completing his course.

After his marriage to Miss Ruse of Chicago he entered the Washington University (St. Louis) and was graduated from the Medical Department in 1898. After practicing at Appleton for five years he came to Minneapolis, where he practiced until retiring from active practice in 1927.

He was a member of the medical staffs of Swedish, Norwegian Deaconess, and Fairview Hospitals, and had been a member of the Scheldrup-Tennyson-Petersen Clinic since its organization.

Dr. Tennyson was a member of the Hennepin County Medical Society, Minnesota State Medical Association, and a Fellow of the American Medical Association; a member of the Sons of Norway, the Odin Club, and of the orders of Scottish Rite, Modern Woodmen and Elks.

His wife and three children, all of Minneapolis, survive him.

*Report of the Necrology Committee, read before the Hennepin County Medical Society at its meeting of December 3, 1928.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

You and Your Society

Today's world works by organization. The men who complain that they have no interest in organized medicine—that they cannot get anything out of it, might well stop for a time and take stock of themselves as well as of organized medicine, its benefits, products and demands.

The County Society is as good as its members make it. Ask yourself how much effort you have put forth, as far as the County Society is concerned, to make it a success. Go a little further, apply the statement to the State Society—even further, to the American Medical Association. What degree of fraternal spirit, of co-ordinated effort, of mutual protection for the profession and for public health would exist if your contributions were the standard unit of measure?

Did it ever occur to you because you have not been asked to take part in the programs of your County Society that possibly your own attitude of indifference may be keeping you from just recognition in your community, and, what is more to the point, that probably you have locked in your own silence some item of knowledge, some vital experience of your own, that might be of tremendous importance to the health of the community or to the preservation of some individual life. What you have learned about your community, your confrères deserve to know in so much as generalities are affected.

If you fail to show enthusiasm for your work, if you are not willing—eager—to discuss with your fellow workers, angles and details of each fresh presentation of old subjects that come under your observation, you are apt to find yourself at the end of the profession.—Illinois Medical Journal, April, 1928.

THE FOLLOWING ARE REASONS WHY PHYSICIANS SHOULD BE MEMBERS OF THEIR COUNTY MEDICAL SOCIETY AND THE MINNESOTA STATE MEDICAL ASSOCIATION:

1. Modern medicine is keeping stride with scientific research. Membership in the State Society gives you a scientific standing.

2. Membership is required for admission on the staff of class "A" hospitals according to the constitution and by-laws of the National Hospital and College of Surgeons Associations.

3. Membership in the State Society provides you with one of the leading medical publications in the country and protects the profession of the state against the unscrupulous actions of all the quacks.

4. Membership in the State Society permits you to discuss medical problems with the leaders of the profession.

5. Membership in the state and local society is necessary before you can affiliate with the reputable professional societies of the country and with the American Medical Association, and gives you entrance to medical societies in any state of the United States.

6. Membership in the State Society gives the opportunity to get indemnity insurance at a reduced rate.

7. Membership in the State Society, of the doctors who are members of the medical staffs of their organizations, is required by most insurance, industrial and railroad companies.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION

The Committee on Scientific Assembly met in St. Paul Saturday, December 8, 1928. The sixty-first annual meeting of the Minnesota State Medical Association will be held in St. Paul, May 13, 14 and 15, 1929. Indications are that there will be an excellent program. In addition to the regular scientific program, many dry clinics have been planned. There will also be scientific and commercial exhibits of unusual interest.

RICE COUNTY MEDICAL SOCIETY

The Rice County Medical Society held its regular meeting Tuesday evening, November 27, in the Stuart Hotel, Northfield. A chicken dinner was served at 7 o'clock.

Dr. G. B. Eusterman, of the Mayo Clinic, favored the society with an illustrated lantern slide lecture on the recent developments in diagnosis and treatment of cholecystic diseases.

Dr. Orin P. Thorson, Northfield, was elected to membership.

Election of officers resulted as follows: President, Dr. Warren Wilson, Northfield; Vice-president, Dr. Neil S. Dungay, Northfield; Second Vice-president, Dr. F. J. Lexa, Lonsdale; Secretary-Treasurer, Dr. C. J. Plonske, Faribault.

Dr. P. A. Smith, Faribault, was elected delegate to the state meeting and Dr. W. S. Warren, Faribault, alternate. Drs. J. Moses, Northfield, Carl Traeger, Faribault, and W. H. Rumpf, Faribault, were elected as censors.

The following members were appointed to act as a publicity committee: W. H. Robilliard, S. B. Haessly, Faribault, and F. M. Babcock, Northfield.

Dr. W. H. Robilliard, Dr. J. M. Murdoch, Dr. F. R. Huxley, Dr. J. Moses and Edwin Bache of Kenyon were appointed on a committee for Hospitals and Medical Education and are to arrange for University medical courses.

A resolution concerning Dr. W. P. Lee, formerly of Northfield, who died from cancer in Winthrop, Maine, was sent to Mrs. Lee and children.

C. J. Plonske, M.D.
Secretary.

MINNESOTA SOCIETY OF INTERNAL MEDICINE

The Minnesota Society of Internal Medicine held its regular semi-annual meeting at Rochester, Minnesota, Nov. 15, 1928. Thirty-six members and many guests were present. A group of members from Minneapolis and St. Paul went to Rochester by the new tri-motored Ford Plane. There were no casualties except for some rather disagreeable gastro-intestinal upsets. The morning and afternoon were given over to the scientific program, while the evening was devoted to the business meeting and dinner.

Dr. H. O. Altnow of Minneapolis and Dr. E. T. Herrmann of St. Paul were elected to membership. The 1928 research prize of $250.00 was awarded to Dr. Max Seham of Minneapolis, for his investigations on the relationship between fatigue, malnutrition, and nervousness in children. Dr. L. G. Rowntree was elected president for 1929, Dr. E. L. Tuohy vice president, and Dr. E. L. Gardner secretary-treasurer.

The next meeting is to be held during the spring in Minneapolis.

RAMSEY COUNTY MEDICAL SOCIETY

Election of officers for the year 1929 was held at the dinner meeting of the Ramsey County Medical Society at the Saint Paul Athletic Club, Nov. 26, 1928.

Dr. W. H. Cole was elected president, Dr. F. C. Schuldt vice-president, and Dr. Albert G. Schulze secretary-treasurer.

AMERICAN COLLEGE OF SURGEONS

Announcement has been made by Dr. Franklin H. Martin, director general of the American College of Surgeons, that the next annual Clinical Congress of the College will be held in Chicago, Illinois, October 14 to 18, 1929.

REGISTRY FOR PHYSICAL THERAPISTS

The Minnesota chapter of the American Physiotherapy Association, at the request of a number of physicians, is establishing a registry for women adequately trained in physical therapy.

The names supplied through this registry are those of members of the American Physiotherapy Association, an organization recognized by the American Medical Association.

The qualifications for active membership in the American Physiotherapy Association are one year's practice in physical therapy within two years of graduation from:

(1) An approved school of Physical Therapy.

(2) An approved school of Physical Education and satisfactory completion of an approved course in Physical Therapy.

(3) An approved school of Nursing and satisfactory completion of an approved course in Physical Therapy.

There is no charge for the services of the registry, the object of establishing it being to give the doctors throughout the state an opportunity of obtaining a trained physical therapist. The coöperation of the medical profession in using the registry will help to maintain the necessary standards in this branch of work. The present registrar is Miss Martha Hindman, 415 Hamm Building, St. Paul, Minnesota, Telephone Cedar 4581.

Application form for membership in the association may be obtained from the state secretary, Miss Ann Kelley, Mayo Clinic, Rochester, Minnesota.

OF GENERAL INTEREST

Dr. William Liffrig, who recently completed his internship at Ancker Hospital, Saint Paul, is located at Goodhue, Minnesota.

Dr. Temple Burling, formerly of Minneapolis, is at the Pratt Hospital in Pocoson, Maryland, where he is engaged in the study of psychiatry.

Dr. A. P. Campbell, formerly of the Philadelphia General Hospital, is now located at Red Wing, Minnesota, associated with Drs. A. E. Johnson and S. H. Anderson.

It is interesting to note that the four range towns in Minnesota recently chose physicians as mayors. In Hibbing, Dr. H. R. Weirick, pioneer physician of the Rood Hospital staff, was chosen; in Chisholm, Dr. E. H. Nelson; in Buhl, Dr. A. W. Shaw; and in Gilbert, Dr. Frederick Barrett.

In the first eleven months of the year 1928 some forty-two persons died as a result of automobile accidents in Saint Paul as compared with only nineteen deaths from all contagious diseases during that period. The nineteen deaths were tabulated as follows: Diphtheria, 96 cases with 3 deaths; scarlet fever, 482 cases with 1 death; whooping cough, 1,156 cases with 7 deaths; measles, 128 cases with no deaths; anterior poliomyelitis, 23 cases with 4 deaths; meningitis, 11 cases with 4 deaths; small-pox, 6 cases with no deaths; and chicken-pox, 1,100 cases with no deaths.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

ARLINGTON CHEMICAL CO.
- Western Water Hemp Pollen Extract-Arlco
- Spiny Amaranth Pollen Extract-Arlco

E. BILHUBER, INC.
- Metrazol
  - Metrazol Ampoules, 1 c.c.
  - Metrazol Tablets

THE GILLILAND LABORATORIES, INC.
- Rabies Vaccines-Gilliland (Semple Method)

H. A. METZ LABORATORIES, INC.
- Salyrgan
  - Ampules Salyrgan Solution, 1 c.c.
  - Ampules Salyrgan Solution, 2 c.c.

E. R. SQUIBB & SONS
- Antipneumococcic Serum, Type I, 50 c.c. gravity container
- Antistreptococcic Serum-Squibb, 50 c.c.. gravity container
- Squibb's Mint-Flavored Cod Liver Oil

TRUTH ABOUT MEDICINES

Mulford Acidophilus Bacillus Blocks.—A culture of *B. acidophilus* (Y strain), embedded in a 2 per cent agar jelly containing milk powder, lactose, d-glucose and sucrose, and marketed in the form of chocolate covered cubes, each of which contains approximately 150 billion viable organisms (*B. acidophilus*) at the time of issue. For a discussion of the actions and uses of bacillus acidophilus see Lactic Acid Producing Organisms and Preparations, New and Non-official Remedies, 1928, p. 228. H. P. Mulford Co., Philadelphia. (Jour. A. M. A., November 3, 1928, p. 1375.)

Phentetiothalein Sodium.—Phenoltetraiodophthalein Sodium.—Phentetiothalein sodium contains from 56 to 59 per cent of iodine. It is used for the roentgenologic examination of the gallbladder and simultaneous test of hepatic function. Following the intravenous injection, the solution appears in the normal gallbladder in sufficient concentration to cast a shadow to the roentgen rays and if the liver is damaged it is retained in the blood in amounts indicative of the extent of impairment.

Iso-Iodeikon.—A brand of phentetiothalein-N. N. R. It is marketed in 2.5 Gm. ampoules. Mallinckrodt Chemical Works, St. Louis. (Jour. A. M. A., November 17, 1928, p. 1549.)

Ephedrine Hydrochloride-Squibb.—A brand of ephedrine hydrochloride-N. N. R. (New and Non-official Remedies, 1928, p. 175). E. R. Squibb & Sons, New York

Syrup Ephedrine Hydrochloride-Swan-Myers.—A syrup containing ephedrine hydrochloride-Swan-Myers (New and Non-official Remedies, 1928, p. 176) 0.2195 Gm., in 100 c.c. (1/8 grain per fluidrachm) and alcohol 12 per cent. Swan-Myers Co., Indianapolis.

Potassium Bismuth Tartrate with Butyn-D. R. L., 02 c.c.—Each c.c. contains potassium bismuth tartrate-D. R. L. (New and Non-official Remedies, 1928, p. 110) 0.1 Gm.; butyn, 0.6 per cent; and metaphen, 0.01 per cent suspended in expressed oil of almonds. Abbott Laboratories, North Chicago.

Ampoules Metaphen Solution 1:1,000, 10 c.c.—1 part metaphen (New and Non-official Remedies, 1928, p. 274) dissolved in 1,000 parts of water by means of sodium hydroxide (four molecules of NaOH for every molecule of metaphen). Abbott Laboratories, North Chicago.

Erysipelas Streptococcus Antitoxin (Lederle) Refined and Concentrated.—An erysipelas streptococcus antitoxin (New and Non-official Remedies, 1928, p. 353), prepared by immunizing horses by subcutaneous injections of the toxic filtrate obtained from broth cultures of the erysipelas streptococcus, or by intravenous injection of cultures of the erysipelas streptococcus obtained from typical cases of erysipelas. It is marketed in packages of one syringe containing one basic dose. Lederle Antitoxin Laboratories, New York.

Ethylhydrocupreine.—This is a synthetic derivative of cupreine and is closely related to quinine. It has the antimalarial and anesthetic action of quinine. Toxic symptoms, however, are more liable to occur than with quinine. Clinical investigation indicates that the drug may be of value in the treatment of lobar pneumonia, if a sufficient amount can be administered sufficiently early without untoward effect. To avoid such effect, it is proposed to secure slow absorption through

the administration of the free base by mouth. The drug has a definite value in the treatment of pneumococci infections of the eye.

Optochin Base.—Optochin.—Ethylhydrocupreine.—For a discussion of the actions and uses see ethylhydrocupreine. Optochin Base is supplied in powder and in two grain tablets. Merck & Co., Inc., Rahway, N. J.

Optochin Hydrochloride.—The hydrochloride of ethylhydrocupreine. For a discussion of the actions and uses see ethylhydrocupriene. For application to eye and instillation into the conjunctival sac, a freshly prepared 1 or 2 per cent solution is used. It is not recommended for oral administration. Merck & Co., Inc., Rahway, N. J.

Tablets Protargentum-Squibb, 4.6 grains.—Each tablet contains 4.6 grams of protargentum-Squibb (New and Non-official Remedies, 1928, p. 397). E. R. Squibb & Sons, New York.

Tablets Solargentum-Squibb, 4.6 grains.—Each tablet contains 4.6 grains of solargentum-Squibb (New and Non-official Remedies, 1928, p. 398). E. R. Squibb & Sons, New York.

Capsules Ephedrine Hydrochloride-Abbott, ⅜ grain.—Each capsule contains ⅜ grain of ephedrine hydrochloride-Abbott (New and Non-official Remedies, 1928, p. 176). Abbott Laboratories, North Chicago, Ill.

Antimeningococcus Serum Concentrated-Lilly.—An antimeningococcus serum (New and Non-official Remedies, 1928, p. 359) refined and concentrated by the Banzhaf method. It is marketed in packages of one 1 c.c. double ended vial with apparatus for intraspinal injection. Eli Lilly & Co., Indianapolis.

Antistreptococcus Serum, Purfiied and Concentrated-Lilly.—A polyvalent antistreptococcus serum (New and Non-official Remedies, 1928, p. 361) prepared by immunizing horses against virulent strains of the various streptococcus groups. It is marketed in packages of one 10 c.c. syringe and in packages of one 10 c.c. vial. Eli Lilly & Co., Indianapolis.

Capsules Ephedrine Sulphate-P. D. & Co.—Each capsule contains 0.025 Gm. of ephedrine sulphate-P. D. & Co. (New and Non-official Remedies, 1928, p. 178). Parke, Davis & Co., Detroit. (Jour. A. M. A., November 24, 1928, p. 1633.)

Tetanus Antitoxin.—This tetanus antitoxin, concentrated (New and Non-official Remedies, 1928, p. 356), is also marketed in a syringe containing 20,000 units. Eli Lilly & Co., Indianapolis. (Jour. A. M. A., October 13, 1928, p. 1109.)

Diphtheria Toxin for the Schick Test.—This diphtheria immunity test (New and Non-official Remedies, 1928, p. 291) is also marketed in packages of two 10 c.c. vials, sufficient for 100 test doses. Schick Test Control is also supplied in packages of one 10 c.c. vial, sufficient for at least 100 tests. H. K. Mulford Co., Philadelphia.

Tetanus Antitoxin Globulin.—This tetanus antitoxin, concentrated (New and Non-official Remedies, 1928, p. 356), is also marketed in piston syringe containers, containing 20,000 units. Parke, Davis & Co., Detroit.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
205 W. 2nd STREET, DULUTH

THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE MEASUREMENT OF THE ULTRA-VIOLET RAYS OF SUNLIGHT. Leonard Hill (First International Conference on Light, Lausanne, Switzerland, Sept., 1928). The rays are measured by comparing the color of a standard solution of acetone and methylene blue which has been exposed to sunlight or skyshine with the color of eight standard tubes. Exposed to a constant source of ultra-violet rays the fading is proportional to the time of exposure.

The ultra-violet rays come mostly from the skyshine. Taking the diffuse ultra-violet from the sky as 100, that from the direct sun was found by Dorno to be:

Height of Sun	U.V. Radiation
20′	12,3
40′	47,6
60′	85,1

Screening off the direct sun makes only a small difference. Ultra-violet ray treatment can then be given by means of skyshine with the hot direct sun screened off by an umbrella.

There is a close correspondence between the acetone blue fading and the erythema producing power of the sun. Dorno says that at Davos wave-lengths most active in producing erythema are only to be found from 8 a. m. to 4 p. m. from May to September. Erythema production, bactericidal effect, the changing of oxy- into methemoglobin, the activation of ergosterol and the formation of Vitamin D are associated with the shorter ultra-violet rays of the sun. With the sun low in the heavens, there are no very short rays. Ultra-violet intensity in Scotland is less than in South England. The average in Davos is higher. Various readings obtained in localities widely scattered are given. In Manhattan, Kansas, readings, varying from 2 in January to 16 in July, are reported. In Egypt (Assuan) readings of 16 to 17 for the 24 hours were reported during the winter months. During the winter, Assuan receives more ultra-violet rays than Davos. Clear atmosphere

and skyshine come into play in giving high ultra-violet readings. The more hazy the sky the less as a rule the ultra-violet reading.

Comparisons were made between the acetone-blue and the photographic method in which the Eder photometer is used. Hill does not consider the latter a reliable method for measuring the biological effect of ultra violet light.

Tables are appended showing daily variations in ultra-violet rays in various localities.

A. T. Laird, M.D.

PROLONGED TREATMENT IN NEUROSYPHILIS: H. C. Solomon, M.D., and A. Berk, M.D., Boston, Mass. (Amer. Jour. of Syphilis, 1928, XII, No. 4). The authors present 20 selected cases giving in brief the condition of the patient before and after treatment and the amount and duration of treatment while the patients were under their care, with their conclusions.

The combined time these patients were treated by the authors was 94 years. Triparsamide was administered 1,710 times; arsphenamine, 791 injections; mercury, 455 injections; 22 intracistern injections; 85 intraspinal injections; 11 intraventricular injections, 14 bismuth injections, and 38 malarial paroxysms induced. Spinal drainage was done 235 times. Spinal fluid tests were made 623 times and blood Wassermann tests 2,415 times. If all these figures are divided by 20 one gets the average treatment, examinations and duration of treatment of each patient.

The authors' conclusions as to results are tinctured with a ray of hope not apparent to the reviewer. The important lesson to be gained from the review of the cases is not mentioned by the authors, that is—that syphilis should be treated thoroughly before it is necessary to consult the neurologist and before paresis and tabes occur. If these patients were private patients they and all their relatives must now be more than poverty stricken. If they were charity patients much public money has been wasted. It hardly seems necessary that others should repeat these experiments in human endurance and therapy. Common sense has been termed the knowledge of yesterday. Perhaps! We wonder what may be the common sense of tomorrow.

J. M. Armstrong, M.D.

THE DURATION OF LIFE IN PULMONARY TUBERCULOSIS WITH CAVITY: Harry L. Barnes and Lena R. P. Barnes (Amer. Rev. of Tuberc., 1928, XVIII, 412). The end-results on nearly 1500 cavity cases admitted to the State Sanatorium at Wallum Lake, R. I., in the last 23 years are summarized in a statistical paper.

Of 616 cases diagnosed by the *x*-ray as having cavities larger than 2 c.m., 99 per cent had positive sputum, 97 per cent of the cavities when only one cavity was present above the upper border of the third rib. The percentage of survivors at the end of the first year was four times as great when the cavities were between 2 and 3 c.m. in size as when they were between 10 and 15 c.m. in size. About 90 per cent of these having cavities larger than 7 c.m. died within a year. Cases which showed marked calcification in the cavity walls had 3 times as many survivors at the end of 3 and 5 year periods as the ordinary cavity cases.

Fifty-three *x*-ray films are compared with necropsy reports. In fifty of these, cavities were found of which location was confirmed by the postmortem examination. Of 651 cavity patients, two have lived more than 20 years, five more than 15 years and thirty-two more than 10 years. In nine cases the *x*-ray signs of cavity and the mottled areas in the surrounding lung tissue cleared. All of these patients are now working and are in good health. Of the whole series of 1,454 cases, 80 per cent were dead within a year; only 5 per cent were alive after 15 years. The percentage of survivors after three and five year periods was five times as great among patients with pulse under 90, and eight times as great after five years among patients with temperatures under 99 as among those whose pulse and temperature rates were higher.

Various other interesting statistics are given.

A. T. Laird, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:
VIRGIL J. SCHWARTZ,
PHYS. & SURG. BLDG., MINNEAPOLIS

ARTHUR C. DEAN
CROOKSTON CLINIC, CROOKSTON

A SIMPLIFIED METHOD FOR *X*-RAY STUDIES OF THE ACCESSORY NASAL SINUSES: H. Caultier Todd, Laryngoscope, 1928, 38, 688. The nose is cleaned with a mild alkaline douche. Apply solution of 1 per cent ephedrin and 1 per cent cocaine to nasal mucosa. After shrinking and anesthetization has occurred apply suction to drain sinuses.

Place the patient upon the *x*-ray table in a dorsal position and have the angle of occiput with trunk at a little less than 45 degrees. Drop about ½ to 1 dram of lipiodol in each nostril while the patient is breathing through his mouth constantly.

Instruct the patient to seize the nose tightly between the thumb and forefinger of the right hand and exhale deeply. Then close the mouth tightly and have the patient attempt to pull air into his lungs through the tightly closed nose. This produces a vacuum in the sinuses. Then suddenly open the nose. Repeat this procedure 5 to 15 times, adding more lipiodol as needed. The sinuses will fill with lipiodol. Before taking *x*-ray pictures, clear the nasal mucosa of lipiodol by the use of sterile cotton on nasal applicators. *X*-ray pictures must be taken postero-anteriorally and Granger angles may be used.

Arthur C. Dean, M.D., F.A.C.S.

REMARKS REGARDING THE DISCUSSION UPON THE ETIOLOGY AND TREATMENT OF HYPOPYON ULCER: G. Herbert Burnham, Toronto (British Journal of Ophthalmology, 1928, XII,

522). A corneal ulcer which is associated with hypopyon is always accompanied by more or less iritis and conjunctivitis. "The Combined Treatment" comprises the internal administration of mercury and of sodium and bromide, together with the hypodermic injection of pilocarpine.

A typical case of the kind above described is managed as follows: Argyrol or neosilvol, gr. XX to one dram, is freely instilled into the eye once daily and is followed in a few minutes by atropin, gr. ½ to the dram; the first is used to control the conjunctivitis, and the second, the pupil. Later they may be discarded. A series of twenty hypodermic injections of pilocarpine is given, one each day, beginning with gr. 1/12 and gradually increasing, if tolerated, to gr. ¼ or even to gr. 1/3.

During the series the mercury is administered twice daily a half hour after eating and the sodium iodide and bromide twice daily one hour after eating. *Between* series these medications are given three times daily. The eye soon feels better, the ulcer becomes more localized and the remaining cornea clearer, so that when the series is completed much improvement is noted.

After four to six weeks a series of ten injections of pilocarpine is again given and this is repeated from time to time until the cornea has returned as nearly to normal as possible. Unless very far advanced, a complete recovery can thus be obtained. However, if a clear cornea is impossible because of a nebula or a leucoma, still the ocular contour will not be changed so as to end in a staphyoma and possibly enucleation.

The results obtained with this treatment over a period of many years have been so uniformly successful that none other has been employed.

(Detailed information regarding the entire procedure may be found in the volume "'The Combined Treatment' of Diseases of the Eye," by G. Herbert Burnham, published by H. K. Lewis, 136 Gower Street, London, 1906.)

VIRGIL J. SCHWARTZ, M.D.

DETECTION OF MALINGERING OF UNILATERAL DEAFNESS: B. M. Becker, Laryngoscope, 1928, 38, 677. To the shallow cup of a Bowles' stethoscope a piece of soft rubber tubing, 12 inches long, is attached. In the distal end of the tube, insert the metal or hard rubber bifurcated piece, and to each end attach a soft rubber tube, one 12 inches in length, the other 24 inches, fitted with proper size ear pieces.

The test consists in first ascertaining that the patient hears distinctly the ticking of any of the instruments through the longer tube when it is inserted in his normal ear, and the diaphragm of the stethoscope is placed directly on the surface of the ticker or in its immediate vicinity.

The test depends upon two facts, either of which can be used for testing purposes. 1. The first principle is that when tubes of unequal length are used and we listen to anything through them, the sound will always be lateralized on the side of the shorter tube. The sound through the longer tube is completely masked so that we are aware of monaural hearing, whereas the hearing is actually binaural. 2. The second element in the test depends upon the fact of binaural hearing. For when you pinch or compress the longer tube through which apparently no sound reaches the ear, one immediately becomes aware of a decided change in the sound in the opposite ear, due no doubt to the fact that binaural hearing has been converted into monaural hearing.

The indirect method consists in that we apparently test the normal ear. The doctor stands behind the patient and inserts the shorter tube in the normal ear, and the longer tube in the supposedly deaf ear. Assuming the left is normal, the right deaf; apply the stethoscope to the watch, etc., and asked the patient if he hears anything, and where. He will promptly answer that he hears the tick of the watch in the left ear. Now you ask the patient to tell you when he notices a change in sound. You compress the longer tube. He says that the sound changed; it is less pronounced and seems to approach nearer the eardrum. Then you know he is malingering, for if the right ear is deaf there is no change in sound perceived through the shorter tube. If the patient perceives no change in sound, we may resort to the direct method.

The order of the tubes is reversed, the short one in right ear, the long one in opposite. You ask the patient the same question. If he says he hears nothing, for he hears nothing with the normal ear, and he cannot commit himself by admitting that he hears the sound in the deaf ear, then we know he is malingering. But if his right ear is deaf, he will hear the sound distinctly through the longer tube. If he is a cunning malingerer and in answer to the question he states that he hears the sound in the left ear, then you gradually compress the longer tube, thereby cutting off all sound from left ear, and if he still hears it, then he is exposed. You may compress the longer tube prior to insertion and ask if he hears a sound. If he hears it, then he is exposed; if not, you gradually decompress tube, and if he still does not hear it, then he again has been exposed. Thus by compression and decompression of longer, or even of short tube, before or after insertion you may modify the test to suit the particular occasion.

ARTHUR C. DEAN, M.D., F.A.C.S.

PEDIATRICS

SUPERVISORS:
CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS
ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

SHOE-DYE POISONING: John Aikman, M.D. (Amer. Jour. of Diseases of Children, June, 1928). The outstanding symptom is general cyanosis, which is as marked as in congenital cardiac disease. This begins from one-half to several hours after the shoes are put on. It is accompanied by general weakness, chills, head-

ache, vertigo, somnolence, nausea and occasionally by stupor. The pulse rate is rapid.

Poisoning is produced by shoe dye applied to tan shoes to produce a black or brown. The poison is absorbed through the intact skin and little if any discoloration may result.

If the shoes are removed the cyanosis begins to decrease but may still be present twelve hours later. While the condition is usually of only a few hours' duration, two deaths are reported.

The toxic agent is due to either aniline or nitrobenzene used as a solvent for the dye.

If shoes are dyed, they should be well aired for several days before being worn.

The active treatment consists of a thorough bath and rest in bed. Inhalations of oxygen may be used if the condition is extreme.

R. N. Andrews, M.D.

INITIAL FEVER IN TUBERCULOSIS: Arvid Wallgren, M.D. (Amer. Jour of Diseases of Children, 1928, 36, 702). In 1916, Herbert Koch described what he called initial fever in tuberculosis. He had in mind a brief period of fever at the particular time that allergy develops after tuberculous infection has taken place.

It is customary to consider carefully the diagnosis of tuberculosis in all continued and obscure conditions of fever in childhood.

Doubt has existed regarding the occurrence of initial fever in older children. This, the author thinks, is because a symptom often accompanying initial fever in older children, namely, erythema nodosum, has not been fully understood.

After tuberculous infection has taken place, several weeks go by before the children become allergic, and, as a rule, the allergic state develops without causing any obvious changes in the health of the children. In a certain number of children, however, the reaction between the virus and the body develops rather sharply as allergy comes on; the time of the appearance of allergy in these cases may be marked by a longer or shorter period of fever. Some of the children who react in this way, at the same time may develop erythema nodosum.

Epstein, who critically investigated the observations at hand concerning the period of incubation in tuberculosis, found that the limits of the period are from three to seven weeks, which time corresponds closely to the interval between infection and the development of erthyema with fever which has just been cited.

The fact that the fever associated with the erythema develops at an interval after tuberculous infection which corresponds closely to the incubation period in tuberculosis indicates strongly that this fever is identical with the initial fever in smaller children.

If tests are made with larger doses of tuberculin, a positive reaction may be obtained long before the Pirquet test is positive, that is, long before the development of the fever.

The fever and its intensity do not appear necessarily to be dependent on marked anatomic changes or even on demonstrable changes, and for this reason it appears probable that an initial fever may result solely from the allergy, as such, and as an expression of the general increase in the reactivity of the body at this time.

R. N. Andrews, M.D.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

ACUTE INFECTIOUS DISEASES. Jay Frank Schamberg, M.D., and John A. Kolmer, M.D., Dr.P.H., D.Sc. 2nd edition. 892 pages. Illus. Cloth, $10.00. Philadelphia: Lea & Febiger, 1928.

SERUM DIAGNOSIS BY COMPLEMENT-FIXATION. John A. Kolmer, M.D., Dr.P.H., D.Sc., LL.D., Prof. of Pathology and Bacteriology, Graduate School of Medicine, University of Pennsylvania. 583 pages. Illus. Cloth, $7.00. Philadelphia: Lea & Febiger, 1928.

GENERAL MEDICINE. George H. Weaver, M.D., et al. 832 pages. Illus. The Year Book Publishers, 1928. 304 So. Dearborn, Chicago, Ill.

OSLER'S MODERN MEDICINE, GENERAL INDEX. Sir William Osler, Bart., M.D., F.R.S. 126 pages. Not Illus. Lea & Febiger, 1928. Philadelphia.

CRITERIA FOR THE CLASSIFICATION AND DIAGNOSIS OF HEART DISEASE. Joseph H. Bainton, M.D., W. C. Munly, M.D., M.C., U.S.A., Robert L. Levy, M.D., and Harold E. B. Pardee, M.D., Chairman. Committee appointed by the Heart Committee of the New York Tuberculosis and Health Association. 92 pages. Price, $1.50. New York: Paul B. Hoeber, 1928.

Because of the great amount of research work that is being done on heart disease, it is necessary that the terms used and the diagnoses made be standardized so that there may be no confusion. This is especially important in view of the fact that a considerable amount of this research work is of a statistical nature. These statistical reports are coming from various parts of the country. If they are to be of practical value, the fundamental material used must be clearly defined so that there may be "uniformity of nomenclature and uniform criteria for using the nomenclature."

In 1923, the New York Heart Association prepared a classification for labeling diseases of the heart. This classification has been used by heart clinics throughout the country. The present book was written to establish definite criteria for making diagnoses in accordance with this classification. The book was prepared by the above named committee appointed by the Heart Section of The New York Tuberculosis and Heart Association.

The first chapter of the book presents the classification for nomenclature prepared in 1923. The remainder of the book takes up the more important criteria for making each diagnosis. This section is divided in accordance with the classification into three divisions, etiological, anatomical, and physiological. Each diagnosis is clearly defined and the most important diagnostic criteria are given for making each diagnosis. A diagnosis made in accordance with this classification gives a complete picture of the heart condition described, not only from a structural point of view but also from an etiological and functional standpoint.

This monograph will prove of great practical value. It is a fundamental work clearly and simply presented. Not only is this a handbook for daily use in the heart clinic but it will be found exceedingly valuable and interesting to any one concerned with the study of diseases of the heart.

M. J. SHAPIRO, M.D.

OPERATIVE SURGERY. J. Shelton Horsley, M.D., F.A.C.S., Attending Surgeon, St. Elizabeth Hospital, Richmond, Virginia. 756 illustrations. 876 pages. St. Louis: C. V. Mosby Co.

The author has wisely incorporated, in all editions of his text on operative surgery, the importance of the preservation of physiological function and the interpretation of biologic processes that follow surgical operations. More than a mere knowledge of anatomy is necessary in surgery as it is essential to conserve and restore physiologic function of tissues involved. Pathology, of course, must be removed, but an attempt must always be made to restore tissue function. The author considers these points well in every type of operation described.

The third edition contains many good additions. The use of colloidal lead in the treatment of cancer is taken up in detail. A new partial gastrectomy with a modification of Billroth I and II is fully described, also describing total gastrectomy. The illustrations are elaborate and complete, with excellent description of all operations to the minutest detail.

Among other new things incorporated into the edition are the syringe method of blood transfusion, a new technic nephropaxy, hypospadias, skin transplantation and repair of cleft palate.

The book is well written, containing chiefly accepted procedures, and is a fine addition to other texts on operative surgery.

A. E. NAEGELI, M.D.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS EXAMINATION REPORT, OCTOBER, 1928.

LICENSED BY EXAMINATION

Name	School and Date of Graduation	Address
Bonesteel, Henry T. S	U. of Colo., M.D., 1926	Mayo Clinic, Rochester, Minn.
Damm, Walter Philip	U. of Iowa, M.D., 1927	961 Selby Ave., St. Paul, Minn.
Davison, Hugh Loyd	U. of Pa., M.D., 1924	Irwin Apt. No. 24, Rochester, Minn.
Davison, Richard Milton	U. of Minn., M.B., 1928	University Hosp., Minneapolis, Minn.
Emmons, William Frank	McGill, M.D., 1924	Mayo Clinic, Rochester, Minn.
Fortier, George M. A	U. of Minn., M.B. 1928	St. Joseph's Hosp., St. Paul, Minnesota.
Fulcher, Oscar Hugh	U. of Va., M.D., 1926	Mayo Clinic, Rochester, Minn.
Krantz, Clement Ireneus	Johns Hopkins, M.D., 1924	Box 419, Duluth, Minn.
Lacy, Nicholas Eugene	U. of Mich., M.D., 1926	Mayo Clinic, Rochester, Minn.
Langenbahn, Carl Joseph	Northwestern, M.D., 1928	Ancker Hospital, St. Paul, Minn.
Magee, Henry Ross	U. of Manitoba, M.D., 1923	102-2nd Ave. S.W., Rochester, Minn.
Mohardt, John Henry	Northwestern, M.D., 1927	Mayo Clinic, Rochester, Minn.
Morehead, Dewey Edison	U. of Minn., M. B., 1924 & M.D., 1925	613 Wash Ave. S.E., Minneapolis, Minn.
Morton, Herschel B	U. of Nebr., M.D., 1925	Mayo Clinic, Rochester, Minn.
Morton, Silvanus Archibald	Dalhousie Univ., M.D., 1926	Mayo Clinic, Rochester, Minn.
Pertl, Albert Louis	U. of Iowa, M.D., 1928	Abbott Hospital, Minneapolis, Minn.
Ray, Edward Hunt	Tulane, M.D., 1922	Mayo Clinic, Rochester, Minn.
Richards, Raymond Randolph	U. of Ill., M.D., 1928	Ancker Hospital, St. Paul, Minn.
Rude, Joseph Oscar	U. of Minn., M.B., 1928	Fairview Hospital, Minneapolis, Minn.
Ruedemann, Ehrhardt	U. of Mich. M.D., 1926	Mayo Clinic, Rochester, Minn.
Sarff, Oliver Elton	U. of Minn., M.B., 1928	Virginia, Minn.
Smith, Junius Penny	U. of Iowa, M. D., 1928	2528 Portland Ave., Minneapolis, Minn.
Swart, Howard Allan	Toronto Univ. M.B., 1926	103 6th Ave. N.W., Rochester, Minn.
Wall, C. Ragnar	U. of Minn., M.B., 1927	1386 Edmund St., St. Paul, Minn.
Yesko, Stephen Aloysius	Georgetown Univ. M.D., 1922	Mayo Clinic, Rochester, Minn.

LICENSED BY RECIPROCITY

Bateman, Clarence Virgil	Northwestern, M.D., 1925	Mountain Lake, Minnesota.
Daniels, Luman Elmer	Rush, M.D., 1921	918 Univ. Ave. S.E., Minneapolis, Minn.
Demo, Percy William	U. of Iowa, M.D., 1927	1717 1st Ave. S., Minneapolis, Minn.
Hall-Kent, Alcina Edith	Manitoba Univ., M.D., 1925	2215 Glenwood Ave., Minneapolis, Minn.
Larson, Milo Henry	Marquette, M.D., 1928	Browerville, Minn.
McEnaney, Clifford Thomas	St. Louis Univ., M.D., 1925	48 7th Street N.E., North St. Paul, Minn.
Marsh, Howard LaRue	U. of Ill., M.D., 1926	Eveleth, Minnesota.
Mattison, Percy A	U. of Colo., M.D., 1927	Winona Clinic, Winona, Minn.
Powelson, Harry Clay	Ohio Univ., M.D., 1924	Mayo Clinic, Rochester, Minn.
Thompson, Fred Rush	U. of Ill., M.D., 1920	517 5th St. S.W., Rochester, Minn.

NATIONAL BOARD CANDIDATE

McCaughan, John Milton	Wash. Univ. Mo., M.D., 1926	Mayo Clinic, Rochester, Minn.

A SKETCH OF THE LIFE AND WORK OF LEONARDO DA VINCI

Leonardo da Vinci lived from about 1452 to 1519, just at the dawn of the great movement which restored the intellect of medieval Europe to a level almost as high as that which had prevailed in Athens nearly 2,000 years before. Hemmeter stated, of the work of Leonardo: "The fairly close study of the principal literary remains would take a competent master in mathematics, physics, engineering, anatomy, physiology, architecture, painting, sculpture and philosophy approximately twenty or twenty-five years."

Studies in anatomy: Leonardo possibly began his anatomic studies in order to perfect his art. In his time no such thing as systematic anatomy existed and the only books available were translations of Galen and Avicenna, whose versions of anatomy were, for the most part, based on animal dissections. It is only natural that he should have turned to active dissection in order to secure the desired information. In 1516 he prided himself on having made dissections of more than thirty human bodies. He is credited with having been the first to make topographic dissections and to use cross sections of the body; many of his drawings illustrate the organ grossly and then the corresponding cross sections.

Leonardo's studies of the muscles are especially fine; he well understood the mechanics of muscle action. Hopstock stated that he made models of the skeleton and represented the muscles with wires or tapes attached to the origin and insertion of the muscles and thus studied their action.

Some of his most brilliant and lasting contributions to anatomy appear in his work on the heart and circulatory system. His keen, searching mind was no doubt perplexed and baffled by the riddle of the circulation. Many of his statements relative to the circulation of the blood are clear-cut and convincing and one is tempted to enlarge on them and to accept them as proof that he had actually pierced through this enigma and understood the circulation. Most students of Leonardo agree, however, that he did not accomplish this and it is entirely possible that he had unwittingly accepted just enough of Galen's dogma to prevent him from reaching this goal.

In his drawings of the heart he represented the wall of the left ventricle as much thicker than that of the right. He emphasized the fact that the heart must be considered as being divided into four chambers; he accurately described and drew the papillary muscles and the chordæ tendineæ and showed how the latter attach to the edges of the atrioventricular valves, and he was the first to demonstrate the presence of the intraventricular moderator band which arises from the septum and attaches to the base of a papillary muscle. He studied the form of the aortic and pulmonary valves by pouring wax into them from above. He knew that their function was to prevent blood from rushing back into the heart and made calculations to show that three aortic cusps are more satisfactory than four, inasmuch as the angles would be weaker if there were more than three. By a very ingenious method he succeeded in making a glass cast of the heart and great vessels, by means of which he studied the currents entering and leaving the heart. He discussed the nature of the origin of the heart beat and finally decided that it is of spontaneous origin within the heart, possibly because he had noticed that the hearts of lower animals continue to beat after being removed from the body.

Studies in physiology: Physiology in the Fifteenth Century was about as it had been left by Galen, and the clean-cut statements of Leonardo, based on the finest inductive reasoning, come as a great light at the end of a long period of darkness. Some of his finest work dealt with the physiology of vision. He discovered that the image of external objects is inverted and reduced in size on the retina of the eye, and he is also credited with having been the first to discover the effect of light and of darkness on the size of the pupil.

He experimented on and grasped the importance of the spinal cord from his observations on frogs. He understood and evaluated the fundamental mechanism of the automatic or involuntary movements, and gave an almost perfect description of them.

No one has stated the problem of the ceaseless transformation of matter and energy with the resultant liberation of heat, which characterizes living animals, more clearly than Leonardo. He also observed the fact that an animal cannot live in air which is no longer able to support the flame of a candle.

Contributions to the methods of science: Leonardo fully appreciated the dangers of applying deductive and teleologic reasoning to the biologic sciences. Careful experimentation was for him the starting point of all science. He formulated the principle and made use of the inductive method of reasoning more than 100 years before Francis Bacon. Leonardo was fully three centuries in advance of his time but his works were lost for nearly 200 years after his death. He could never bring himself to arrange and edit his massive collection of notes for publication, and his works on anatomy, as we know them today, were probably never intended for publication but were notes and drawings made as he dissected. However, as Gilberto Govi has said, "Leonardo was the inventor of the system to which Galileo, a century later, owed his finest discoveries; the system to which Bacon, who taught it without understanding it, is indebted for his reputation as the restorer of the sciences."—C. WILHELMJ, M.D., Proceedings of the Staff Meetings of the Mayo Clinic, May 2, 1928.

YOUNG LADY wishes employment in doctor's office, hospital or clinic. Two years' training *x*-ray, Physiotherapy, Laboratory work, Basal Metabolism, Histories, and general clinical duties. References furnished. Address D-1, care MINNESOTA MEDICINE.

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MINNESOTA MEDICINE

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VOL. XII FEBRUARY, 1929 No. 2

THE IMPORTANCE OF STAINED PREPARATIONS IN THE STUDY OF AMEBIC INFECTIONS

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THE prevalent idea that amebic infections of man can all be grouped under the two headings "histolytica" and "coli" and that the two species can be readily distinguished on the basis of relative motility and the presence or absence of included red corpuscles, has been shattered by the extensive studies of the past few years. Today the discussion as to pathogenicity is extended to upwards of a dozen species and it will never be settled by *a priori* arguments but only by long continued clinical observations and critical studies. An absolute requisite to such work is the accurate determination of the species of ameba involved.

Even the physician who is still content to group his findings all under the two headings must realize that the motility of *histolytica* is greatly affected by temperature, variations in the reaction of the stool, and by length of time after discharge. The criterion of presence of red blood corpuscles in the endoplasm is practically diagnostic in the case of active dysentery, with bloody mucus, but it must be remembered that in the chronic cases, where the amebæ are brought to light only after saline catharsis, they are rarely found with red blood corpuscles included. What technic, then, should be adopted in the study of these infections?

There is no question but that the vegetative stages of the amebæ are most readily noted in fresh preparations. The definite separation of the species is another matter and even the most experienced workers find carefully stained slides an important aid to diagnosis. The presence of more or less numerous inclusions of bacteria, spores, and similar inclusions will serve to rule out *histolytica* but the absence of these in an individual specimen does not prove that one is dealing with that species. Moreover, under the crowded conditions of the average laboratory the tendency is to base a diagnosis on the study of the first two or three organisms noted. Such a practice is unsafe, for concurrent infections with two or more species are of common occurrence.

While the study of the living form is invaluable and may be, of itself, sufficient in typical cases, protozoologists are in agreement in considering that the study of the cysts furnishes the most reliable method of differentiating species of amebæ. Often they are the only forms available and, unlike the motile stages, they retain their characteristics for some time after a stool has been passed. In case of necessity they may be preserved in feces in 10 per cent formalin for later study. In any event, proper staining methods are essential for their determination.

Whether it be in the study of vegetative forms or cysts, the stain should be the one which best brings out the nuclear structures. One has only to refer to the literature of protozoology to learn that the most available and most critical basis for the determination of genera and species of these minute organisms is afforded by the morphology of the nucleus. The statement, then, that "nuclear structures are about all that are brought out by the staining method" is by no means to be taken as a criticism of the technic.

The standard and, once mastered, the most convenient method for preparation of permanent mounts is that of fixation in warm Schaudinn's fluid and staining in iron hematoxylin.

Schaudinn's fluid is composed of two parts of saturated aqueous solution of corrosive subli-

mate, and one part of 95 per cent ethyl alcohol, acidulated by the addition of glacial acetic acid. A convenient quantity is:

Saturated aqueous solution of corrosive sublimate ..... 60 c.c.
95 per cent ethyl alcohol..... 30 c.c.
Glacial acetic acid..... 3 c.c.

It should be heated until steam is given off (60°—70° C.) immediately before using. Handling slides with forceps or allowing metal to come in contact with the solution in any way must be avoided or precipitates will ruin the preparations. The various stages may be outlined as follows:

1. By use of an applicator stick, or a match, smear the fresh fecal material over two-thirds of a thoroughly clean slide. The smear should be thicker than for ordinary bacteriological work and must not be allowed to dry at any stage until finally mounted in balsam.
2. Fix in the warm Schaudinn's fluid 15 minutes.
3. Rinse in 50 per cent alcohol 3 to 5 minutes.
4. Transfer to 70 per cent alcohol to which has been added enough tincture of iodine to give a bright straw color, 10 minutes. If the fluid is bleached, renew it.
5. Harden in 95 per cent alcohol, 1 hour or more.
6. 70 per cent alcohol, 5 minutes.
7. 50 per cent alcohol, 5 minutes.
8. Rinse in distilled water.
9. Mordant in a 4 per cent solution of clear violet crystals of iron alum (ammonio-ferric sulphate) in distilled water, 6 hours.
10. Rinse in water.
11. Stain in 0.5 per cent ripened solution of haematoxylin in distilled water, 6 hours to over night.
12. Rinse in water.
13. Differentiate in 2 per cent iron alum solution, controlling by rinsing in water and examining under the microscope from time to time. The background should be grayish and it is desirable to differentiate the slides to a slightly different degree since it is not feasible to search long for cysts as controls.
14. Wash in running water, 20 minutes.
15. Dehydrate in 50, 70, 95 per cent and absolute alcohol, 5 minutes each.
16. Clear in xylol, 5 minutes.
17. Mount in Canada balsam.

The periods suggested for mordanting and staining are not fixed, but usually work out conveniently in practice and give excellent results. The whole process may be greatly reduced, even to the extent of mordanting for a half hour and staining for an hour, but this short method is more difficult to control.

The properly prepared slide is not only valuable for immediate diagnostic purposes but affords opportunity for careful, unhurried study. Moreover, it constitutes an important part of the permanent record of the case.

SURGICAL TREATMENT OF UTERINE PROLAPSE*

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I HESITATE somewhat to bring up the subject of uterine prolapse, as there has been so much written on the subject in recent years. The reason for this, no doubt, is that the profession is not always in accord as to the best type of treatment, probably because many of the operations advised are only suitable in special cases. Furthermore, the position of the uterus seldom causes symptoms *per se* but the accompanying drag on other pelvic organs, especially the bladder, makes operation advisable. The age of the patient, her marital state, the relative danger of an abdominal or vaginal operation, and the severity of the symptoms must be carefully considered in each case. Any routine type of operation must be condemned as it would certainly be too radical in many cases or insufficient in others.

It is necessary to realize that the uterus, bladder, and rectum are incorporated in the upper pelvic diaphragm, and they must be considered parts of it. In all cases of uterine prolapse, the bladder and rectal walls are involved to a greater or less extent in this downward displacement. The malposition is made possible by laceration or overstretching of the pubosacral fascia and muscles, which first allows backward displacement of the uterus, and later prolapse. If the pelvic floor is torn, rectocele will also develop. The condition must be regarded and treated as a hernia.

The anatomy of the female pelvis varies probably more than the anatomy in any other part of the body, and anomalies are common. It is believed that the uterus is normally slightly movable, but in a position of anterior flexion, and held in this position by the pelvic diaphragm, the cardinal ligaments, the round ligaments, the uterosacral ligaments, and intra-abdominal pressure. Variations from this position, described as normal in textbooks, are often found in the course of general examination. They do not often give rise to symptoms. Stacy reported 20.2 per cent of uncomplicated retroversions in 1,000 unmarried women examined at The Mayo Clinic. Such cases must be looked on as congenital, and I believe that any attempt to change the position of the uterus in such cases is likely to cause discomfort, and that little if any protection will be afforded against later prolapse. Such cases are often associated with an infantile type of uterus, and imperfect development of the uterine support. After the menopause, uterine prolapse occasionally develops in nulliparous women, but it is not likely to be associated with cystocele or rectocele, and gives little if any trouble until the cervix presents at the vulva. When operation is advisable in such cases, amputation of the cervix, with ventral fixation, gives good results.

The type of case under discussion is acquired malposition of the uterus, practically always the result of the trauma of child bearing, or of infection. It is difficult to conceive of hard work or position *per se* causing anatomic changes from the normal, but if acquired or congenital retroversion has been present such factors would undoubtedly increase the tendency to procidentia. Uterine prolapse is always preceded by retrodisplacement of the body of the uterus. As long as the cervix is held in the hollow of the sacrum, and the corpus well anterior to it, there is little tendency to descensus, even when there is extensive laceration of the lower pelvic diaphragm. On the other hand, the uterus will gradually descend to a lower and still lower level when retroverted, as the result of overstretching or laceration of the upper pelvic diaphragm, and the cardinal, uterosacral, and round ligaments, particularly if the perineum has also been badly lacerated. Increased intra-abdominal pressure and the upright posture aggravate the condition.

TREATMENT

Many of the radical operations necessary for marked degrees of uterine prolapse, cystocele, and rectocele in women who have passed the menopause could be avoided by proper management and minor operations earlier in life. The majority of women applying for treatment for procidentia date their troubles from their first confinement. Failure on the part of the general practitioner or obstetrician to recognize and ad-

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Submitted for publication December 12, 1928.

equately treat subinvolution, pelvic infections, and lacerations of the cervix and perineum, is responsible for the amount of radical treatment later. Cases for operative treatment may be divided into four main groups: (1) those in which it is expedient to preserve the function of child-bearing; (2) those in which it is important to preserve the pelvic organs, and in which there

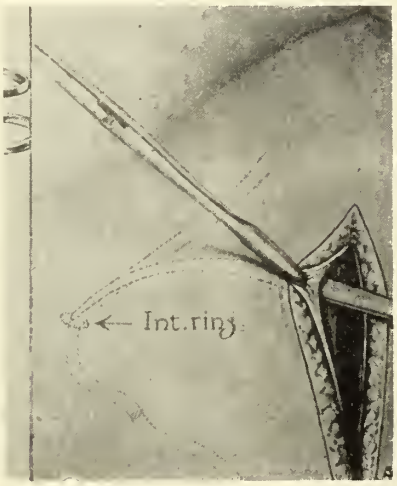

Fig. 1. Modified Gilliam operation by shortening the round ligaments through the internal abdominal ring.

are contraindications to the production of sterility; (3) those in which the patients are near or have passed the menopause, and there is no contraindication to removal of the uterus, or, if advisable, the uterus, tubes, and ovaries, and (4) those in which partial or complete obliteration of the vagina will be the best method of taking care of the condition.

In treating patients during the child-bearing period, an attempt should be made to restore as nearly as possible the normal relations, and not to interfere with function. Repair of lacerations, or superficial cauterization, is therefore preferable to amputation or thorough cauterization, and shortening of ligaments is preferable to permanent fixation or other radical changes in the anatomic relations. For most women under the age of thirty-six with a well developed prolapse accompanied by cystocele and rectocele, it is advisable to perform anterior colporrhaphy for cystocele, and perineorrhaphy for rectocele, with either external or internal shortening of the round ligaments. External shortening of the round ligaments of the Alexander type is now seldom advised. Opening the abdomen adds little if any risk to an operation, and there are often other surgical conditions within the abdomen which can be taken care of at the same time. The extraperitoneal operation is very satisfactory, however, and should be used more frequently if there is no other evidence of disease in the abdominal or pelvic organs. When the abdomen is opened, I prefer a modified Gilliam type of shortening (Fig. 1), but the Baldy-Web-

Fig. 2. Modification of the Watkins-Wertheim operation in which the uterus is too large to use in the ordinary way. The cervix is amputated. The anterior wall and all the endometrium, including the interstitial part of the tube, are removed from the uterus. The remaining part of the uterus is stitched together, making a mass about half the size of the original uterus.

ster type is also satisfactory. If a raw surface is to be left on the anterior uterine wall as the result of separation of adhesions or myomectomy, the Coffey or Willis type of anterior plication of the broad and round ligaments is satisfactory, and if a raw surface exists on the posterior uterine wall, posterior plication, as advised by Venable, should be the operation preferred.

If women are close to or have passed the menopause, and slight prolapse and troublesome cystocele or rectocele exist, I advise a Watkins-Wertheim interposition operation, ligating the tubes if necessary, and repairing the pelvic floor. In many cases, especially before the menopause, the uterus is too large for this procedure, and if the regular technic is followed the patients

complain of a bulging in the introitus. To overcome this, it may be advisable to reduce the size of the uterus by removing part of it. A wedge-shaped piece can be removed from the fundus, and the cervix can be amputated, but I prefer to remove all the anterior wall, and thoroughly denude all the mucous membrane from the uterine cavity and cervix, cutting a wedge-shaped piece from the fundus on each side at the site of entrance of the fallopian tubes (Fig. 2). Bleeding is controlled by suture, and the resulting uterine tissue, less than half the size of the original organ, is sutured under the bladder in the regular way. The results are good in practically all cases. This operation deserves special mention as it effectually cures the cystocele, eliminates the danger of carcinoma, and prevents troublesome and dangerous sequelæ such as distortion of the base of the bladder or anterior vaginal wall, or the possibility of pregnancy.

I believe that failure following the Watkins-Wertheim type of operation is due, first, to poor selection of cases, especially cases of marked prolapse, and second to failure on the part of the operator to free the bladder sufficiently, and to fix the uterus adequately to the uteropubic fascia.

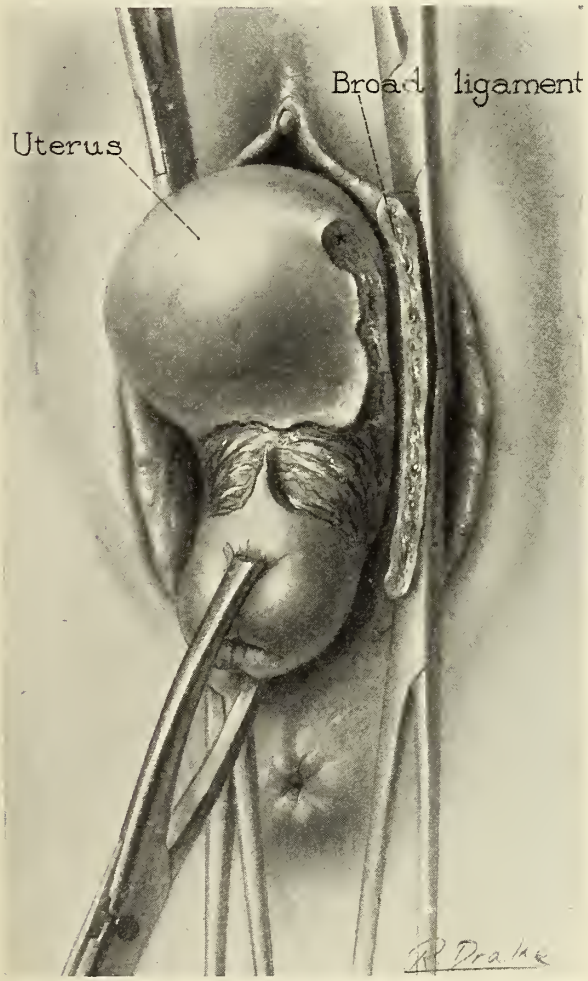

Fig. 3. Mayo vaginal hysterectomy. Uterus removed, after clamping broad ligaments.

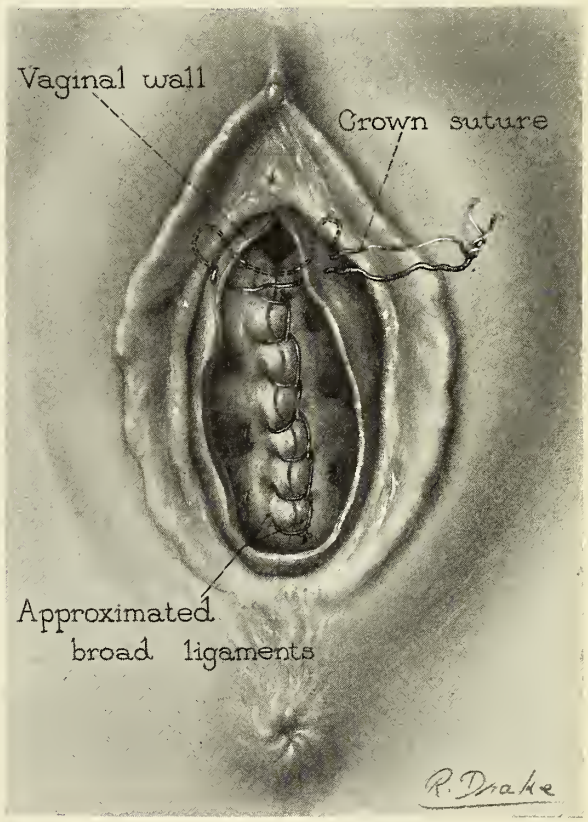

Fig. 4. Approximated broad ligament stitched under pubic arch and anterior vaginal wall, as in Watkins-Wertheim operation.

The Mayo operation for cystocele and prolapse is especially suited for cases in which large cystoceles and marked prolapse are present. The more marked the prolapse, however, the shorter the vagina, after the operation is completed, but as most of these patients are advanced in years, this is not a serious objection. The principle of the operation is exactly the same as in the Watkins-Wertheim, except that on account of the marked stretching of the broad and associated ligaments, allowing an extreme degree of prolapse, the uterus is removed (Fig. 3). The approximated broad ligaments are sutured under the bladder and into the anterior vaginal wall,

in the same manner as in the other operation (Fig. 4).

In cases of marked prolapse, and relatively small cystocele, good results are obtained by first performing perineorrhaphy, then opening the abdomen through a low median-line incision, and fixing the uterus into the anterior abdominal wall. The size of the uterus and the extent of prolapse will determine whether simply to fix the fundus of the uterus to the under surface of the rectus muscles as in the Vineberg, Leopold, Kelly or Olshausen operation, or to draw the body of the uterus through the incision, as in the Kochen or Murphy operation. In cases of extreme prolapse, it is sometimes advisable to perform subtotal or total abdominal hysterectomy and to anchor the vault of the vagina into the abdominal wound. None of the operations mentioned in which the uterus or vault of the vagina is fixed anteriorly is satisfactory if the prolapse is complicated with cystocele, as there is a marked tendency for it to increase in size if the patient is on her feet much.

It is sometimes advisable in elderly patients with procidentia and a large cystocele and rectocele to denude the mucous membrane on either side of the vagina from the introitus to the cervix uteri, and to approximate these raw surfaces as in the La Fort operation, holding the uterus well up and commencing the suturing at the vault of the vagina, leaving two narrow mucous tracts to take care of any discharge from the uterus. If a vaginal hernia develops following hysterectomy, it is sometimes necessary to obliterate the vagina completely by first removing all the vaginal mucous membrane, and closing the opening by multiple circular sutures, commencing at the top and working down to the introitus, simply leaving room for the urethra under the pubis.

CONCLUSIONS

1. A tendency to procidentia can be overcome in most instances by satisfactory repair of lacerations at childbirth, and the early institution of non-operative measures.
2. It is important to realize that the condition under treatment is a hernia, and that the larger the hernial opening the more difficult the closure.
3. The type of operation should be carefully selected in each case. One should keep in mind the extent of the prolapse, the size of the associated cystocele, the age of the patient, her marital state, and the relative danger of an abdominal or perineal operation.
4. Perineorrhaphy is essential in all cases.
5. In difficult and recurrent cases, it is sometimes advisable to obliterate the vagina.

CONGENITAL MALFORMATIONS OF THE UTERUS AND VAGINA: REPORT OF THREE CASES

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and
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MALFORMATIONS of the uterus are often due to the persistence of septa, either transverse, longitudinal, or a combination of both. Three types are thereby produced:

1. Double uterus and vagina, owing to failure of fusion of the two Müllerian ducts.

2. Genital canal atresia, due to the fact that the fused Müllerian ducts fail to open into the urogenital sinus.

3. Double uterus and vagina with unilateral atresia. Since fusion of the Müllerian ducts begins from below upwards, the lower fused ducts form the vagina; the middle parts form the uterus, and the non-fused upper portions become the Fallopian tubes.

Because of the order in which fusion of the ducts takes place, it is common to find a double uterus with one vagina, or a double fundus with common cervix and vagina; but the reverse condition, namely, double vagina with undivided uterus or double cervix with undivided fundus is never found.

Double vagina occurs in some cases of double uterus if the septum between the two halves of the vagina extends to the vulva. If the septum stops short of the vulva, the orifice may be single and the septum or portions of it are discovered only on digital examination or after marriage when symptoms occur. In some cases one half of the vagina is enlarged, the other half ending as a blind pouch.

Double uterus may occur as one of three types, namely, uterus septus, uterus bicornis, or uterus didelphys. In the first two the cervix may be either single or double but in the last type there are always two cervices.

In uterus septus, the external fusion of the Müllerian ducts has occurred, but the septum formed by their approximation persists, making the uterus appear normal outwardly. Section, however, reveals two cavities. The septum may extend to the vulva, giving the appearance of a double barreled gun; or it may involve only the uterus, the vagina being single; or the external os may not be reached so that the cervix appears normal. The last type is the uterus subseptus.

Where external union has occurred in the lower parts of the uterine body, but is absent in the upper part, we have a condition known as uterus bicornis. In this condition the extent of the septum varies, reaching to the vulva, to the os externum, or to the os internum only, in which case it is called uterus bicornis unicollis. Where the two halves of the uterus remain distinct externally and can be moved independently of one another, we have uterus didelphys. Here the vagina is invariably double with only a connective tissue union of the two halves.

A fold of peritoneum usually passes between the two halves, extending directly from the bladder to the rectum. A separate ovary and Fallopian tube are united to each uterus. Often the halves are unequally developed and one vagina may end blindly above the vulva so that the corresponding uterus is shut off from the outside. This condition existed in one of our cases.

Where one half of a double uterus is occluded at the cervix, or atresia of the corresponding vagina is present, hematometra usually occurs. DeLee states that the connecting bridge of tissue between the two uteri is usually imperforated and even if the two halves are broadly opposed, the two cavities do not communicate. Case number one in our series is interesting, because the two halves of the uterus did communicate, and because of this, hematometra was absent in the right uterus. As shown in the diagram it is our theory that if menstruation did occur in the right uterus, the blood passed into the left uterus and passed away through the left vagina.

Case 1.—Mrs. J. D. P., female, aged 27, consulted one of us (F. E. K.) in June, 1928, complaining of the following: Goiter (twenty years' duration), nervousness, palpitation, loss of weight (40 pounds in one year), belching during meals, fatigue, pain over the loins, abscesses in the vagina which broke about once every three months; also pain in the rectum with mucus discharge. Physical examination revealed a tender mass, the size of an orange, in the right cul-de-sac, running along the lateral vaginal wall and separate from the uterus. The uterus was slightly enlarged and freely

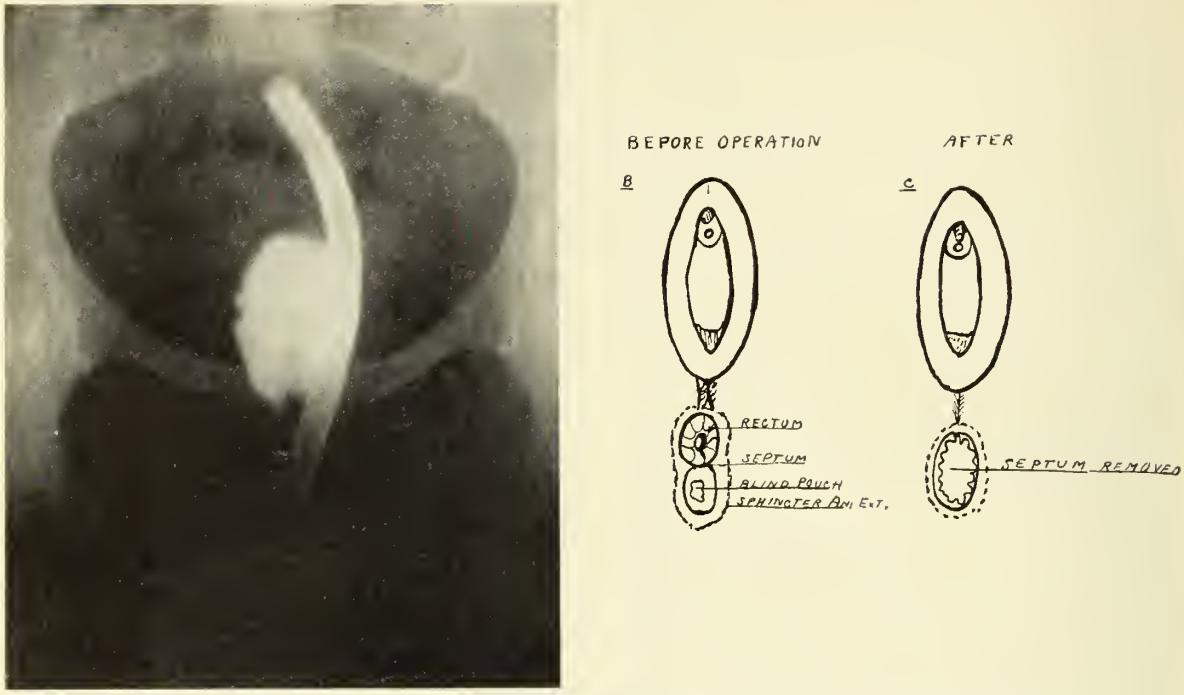

Fig. 1. A—X-ray picture showing blind pouch injected with barium. The catheter in the rectum shows the absence of communication between the rectum and the blind pouch.
B—Diagram showing relation of blind pouch to the rectum before operation.
C—Same case after operation.

movable. Rectal examination revealed a prolapse of the mucous membrane, also a blind pouch with its opening between the rectum and the coccyx. It appeared as if the rectum was divided into two parts, both these parts being surrounded by the sphincter and externus.

Past History.—Usual childhood diseases; menses established at thirteen years of age and have been regular every twenty-eight days, lasting eight to ten days and being very profuse. Menses are accompanied by severe pains and vomiting lasting two weeks, confining patient to bed and necessitating morphine for the pain. This condition prevailed until the operation described below was performed in 1924.

In 1924 (Fig. 2) examination revealed an enlarged thyroid gland and normal heart and lungs; a tender round

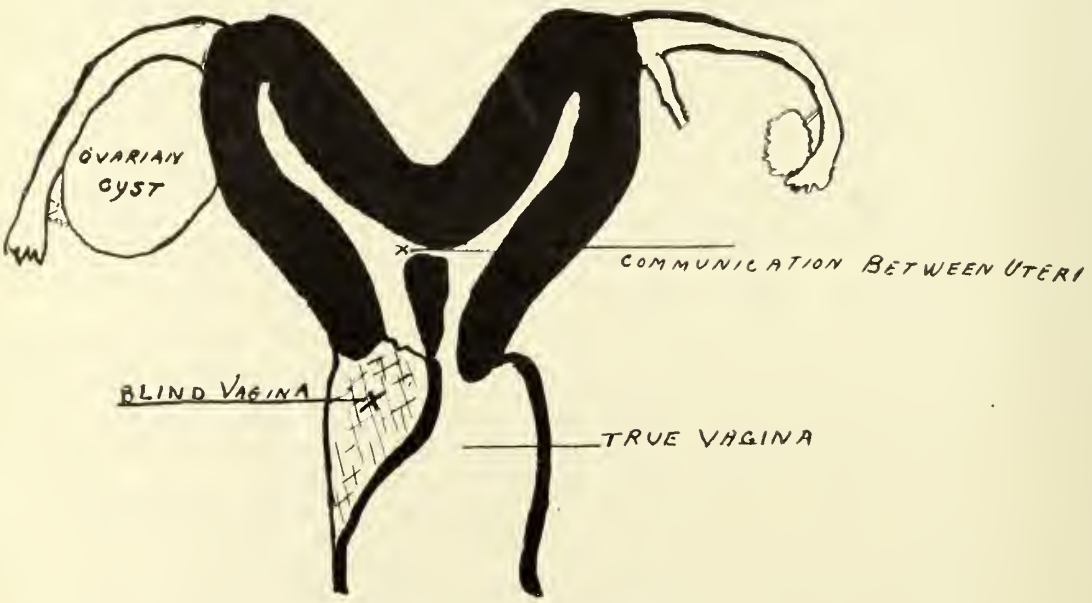

Fig 2. Diagram of condition present in 1924 before operation

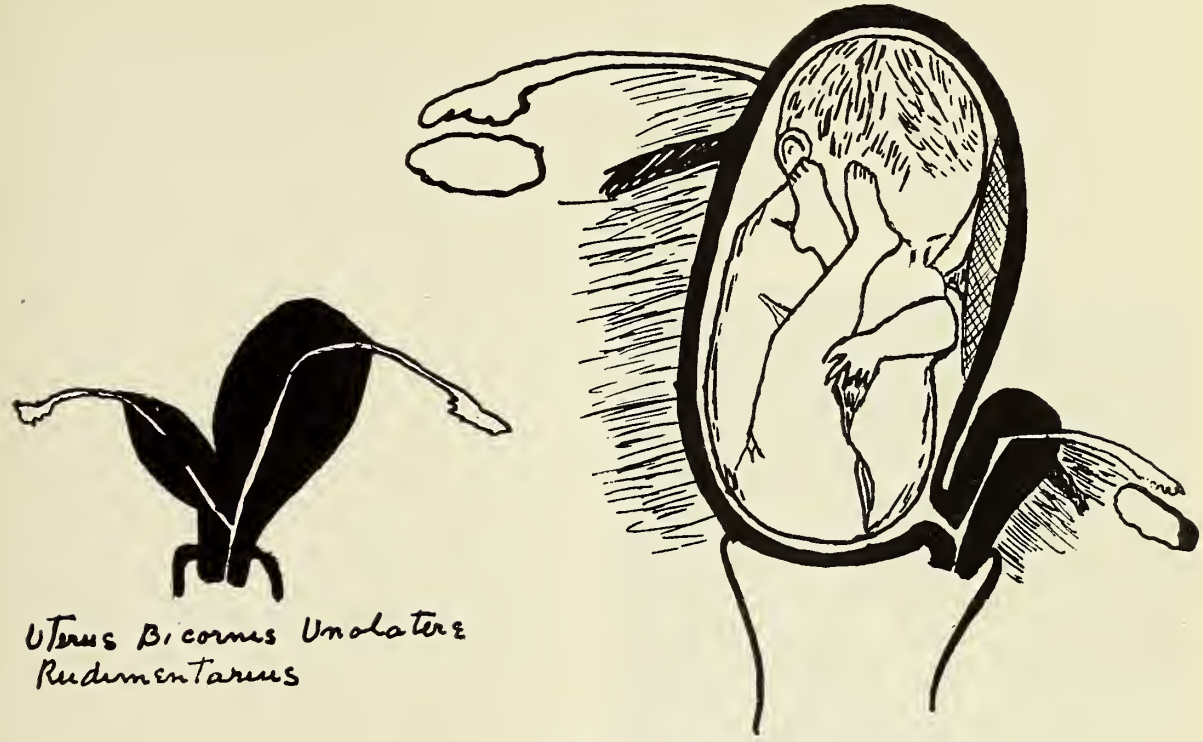

Fig. 3.

mass the size of an egg was felt in the right lower abdominal quadrant. This mass seemed to be continuous with a well formed irregular mass in the right vaginal wall and a large mass was felt in the left fornix. This mass enlarged at each menses. At operation a double uterus with a small communication between the two halves was found. A tube and round ligament came from the lateral wall of each uterus. The right tube was enlarged, inflamed and adherent to a large ovarian cyst filled with blood. The right uterus terminated at a point in the vault of the vagina, but no communication could be found. The left tube and uterus were normal. The right tube, ovary and the larger right uterus and appendix were removed and the right round ligament was implanted into the lateral wall of the true uterus.

Since 1924 the patient has had two healthy children.

On August 15, 1928, the patient had a thyroidectomy done and on August 25, 1928, a large vaginal cyst, the size of an orange, was removed. This cyst ran under the right vaginal wall and contained cheesy material. The pathologist reported it to be an epidermoid cyst of the vagina.

At a later operation the septum between the rectum and blind pouch was removed, making a single opening as shown in Figure C. The patient made an uneventful recovery and has had no further trouble since.

Case 2.—One of us (J. R. M.) was called in consultation to see this patient, a primipara, twenty-four years old, on April 8, 1928. The following history was elicited: Her last period was April 14, 1927. The development of the pregnancy was uneventful. She felt life at the usual time and expected her confinement January 19, 1928. Some time in December she ceased to feel life and her attending physician could not hear the fetal heart. On December 31, she had a few slight pains and had a slight bloody discharge. Her doctor advised that nothing be done. She was watched closely and nothing abnormal developed except that it was stated that the uterus seemed to be always firmly contracted and there was some tenderness. There was also an occasional slight bloody show.

About March 27, 1928, she began to notice a little more bleeding but there was no pain, and her temperature began to rise to 99.5 and 100 degrees each evening. She was brought to the hospital and the cervix was packed in an attempt to bring on labor pains. A few unsatisfactory pains developed but soon stopped. The uterus continued firm and hard. The next day a few small doses of pituitrin were given but nothing happened except a few more slight pains.

On Sunday, April 8, she was anesthetized and her attendant attempted to dilate the cervix when some substance which was thought to be placenta was encountered and was bored through with the finger. The breech was then found to be presenting. Some attempt was made to pull down the feet but the patient went into shock at this time so the attempt was abandoned. Heavy tenaculi were clamped on the breech and traction made with weights to prevent bleeding from what was supposed to be a placenta previa.

She was seen at this time and found to be pale, with a pulse of 130 but no external bleeding. The uterus was tetanically contracted and very tender. A vaginal examination showed what felt like a cervical ring dilated about three fingers' breadth. The breech was present-

ing and was forced down firmly into the pelvis. A diagnosis of ruptured uterus was made on the general findings and an operation was done.

The uterus was found torn off at the bladder attachment about three quarters of the way around and was held only by the parametrium. There was a moderate amount of blood in the uterine cavity. A small normal size uterus was found to the left of the pregnant uterus, which had a normal tube, round ligament and parametrium on its outer side. The pregnant

Fig. 4.

uterus had been attached to this by a broad pedicle which was torn across. There was no cervix attached to the pregnant uterus. The small uteru had to be removed in order to close the vagina. The vagina was closed and the bladder peritoneum stitched over it.

The patient did not react well from her operation and, in spite of intravenous glucose and so forth, died in about eighteen hours. Blood transfusion was not possible due to lack of proper facilities.

The accompanying drawing (Fig. 3) illustrates the condition found. This was apparently a uterus bicornis rudimentarius with pregnancy in the rudimentary horn. The uterus was apparently torn off from the vagina during the attempt to dilate the cervix. Koplovitze of Brooklyn reports a similar case in which the fetus was dead two months and an anterior vaginal hysterectomy was attempted. He got into the peritoneal cavity and then did an abdominal operation and found a condition similar to ours, with the pregnancy in a rudimentary horn attached by a pedicle. His patient recovered.

Case 3.—Mrs. N., aged 31, married six years, consulted us to determine the cause of her sterility. The history and physical examination were negative, except that on pelvic examination a double uterus (didelphys) was found. The Rubin test proved the tubes to be patent; air entering easily at 100 to 120 mm. of mercury pressure. Later lipiodol was injected into each cervix and an *x*-ray picture was taken which confirmed the diagnosis (Fig. 4).

CONCLUSIONS

1. Anomalies of the genital tract occur more commonly than is supposed.
2. Pregnancy occurring in cases of bicornuate uterus might result in disaster if not recognized early and proper treatment instituted.
3. Each of the above cases demonstrates a different type of anomaly.

BIBLIOGRAPHY

1. DeLee, Joseph B.: Principles and practice of obstetrics. Lippincott, 1928.
2. DeRoulet, Lewis: Handbook of gynecology, C. V. Mosby, 1917.
3. Kelly, Howard T.: Text-book of gynecology.
4. Kopolovitze, B.: Am. Jour. Obst. and Gyn., February, 1928.
5. Levison, Charles G., and Wolfson, Mast.: Am. Jour. Obst. and Gyn., December, 1927.

VERONAL AND PARALDEHYDE ADDICTION AND POISONING*

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Saint Paul

DURING the last several years we have been impressed with the number of non-narcotic addicts and poisoning which have come to our attention, the most striking of this group being those caused by veronal and paraldehyde. Barbital, diethyl barbituric acid, under the trade name of Veronal, was introduced as a safe hypnotic in 1903. Kress in 1905 published a long list of cases in which unfavorable results had followed its use. In 1911-13 in England and Wales, it occupied seventh place as the cause of death from all poisons. As a result it was scheduled as a "poison" and can there be obtained only by prescription, and a proper record being kept of its sales. In America it generally has been sold promiscuously to the public, its demand stimulated by advertising, and its use facilitated by the public obtaining it without restriction, either as to method or amount. This applies also to other members of the barbital group and other hypnotics.

Barbital is a rather quickly acting hypnotic. Respiration and circulation are little affected by its medicinal use. In single doses it is safer than chloral. Its effect is long continued, due to its slow elimination from the body. Barbital is excreted unchanged, to the extent of 70% or more in the urine. The excretion is slow, sometimes not reaching the maximum until the second day, and continuing on the third and fourth day after medicinal use.

In acute poisoning the symptoms are usually those of depression of the central nervous system: clouding of the sensorium up to deep unconsciousness, with absence of corneal reflexes, Shallow feeble respiration (maybe Cheyne Stokes in type), cyanosis, subnormal or slightly elevated temperature, lowered blood pressure, slow pulse (sometimes irregular) are the symptoms commonly found. The pupils are sometimes constricted, they maybe irregular, and are disordered as to reaction. There is often paralysis of the ocular muscles and double vision. The reflexes may be altered, and in severe poisoning may be abolished. Death is due to respiratory failure.

Mentally the picture is that of confusion, disorientation, thick and sometimes scanning speech; and the power of attention, retention and memory is variably impaired. Sometimes delusions of a paranoid trend are encountered. In other cases depression and a melancholic trend, while in others euphoria and expansive feelings are found. Sand has pointed out that, with the exception of a small number of accidental poisoning, the sufferers of barbitalism are possessed of a neurotic or psychic stigma. The cases of acute poisoning he found fell in the manic depressive, while the chronic users he found to be among the psychopathically inadequate or inferior group. This has been our experience. Many are alcoholic and some are sufferers from the morphine habit.

The literature is full of reports of recovery from doses of 100 to 125 grains, or more. Death has been reported from as low a dose as 15 grains, the fatal dose depending of course to a large extent on the personal equation and time of institution of treatment. However, the average minimal lethal dose is 50 grains.

Treatment consists of instituting institutional care. Supportive and eliminative measures should be taken. Bad prognostic signs are a prolonged unconsciousness, absence of reflexes and signs of circulatory failure. Those who remain unconscious 5 days usually die. We have found that treatment outside an institution not only is difficult but is practically impossible in securing good results. Our preference is for immediate withdrawal of the drug, followed by treatment of a supportive and tonic nature. However, it must borne in mind that these cases are usually due to a basic personality defect. It is then readily recognized that the same difficult problem found in dypsomania and drug addiction is found. Four cases are cited, illustrating some of the problems in veronal addiction.

Case 1.—This patient, a man aged 49, was seen in December, 1927. He was of the constitutionally inadequate type. For ten years he had been on a spree every two or three months. During the last two years

*Presented before the Southern Minnesota Medical Association, Rochester, Minn., Oct. 3, 1928.

he made serious efforts to reform and had been under institutional care three or four times. He suffered from general nervousness and insomnia. For this he took veronal and sometimes luminal. During the last year he claims to have left alcohol alone. I saw him at the hospital where he had been brought in an unconscious condition. Empty bottles of luminal and veronal were found in his room, but it was impossible to estimate the exact number of grains taken. Our best calculation was between 40 and 50 grains in two days. He was cyanotic, his pulse was rather slow, blood pressure 110 over 70, with a trace of albumin in the urine. He slept for two days, and on awakening, he was disoriented as to place, his speech was thick and rather scanning, he had a coarse tremor, and he complained of a blurring of vision. These symptoms gradually disappeared, and he was discharged at the end of three weeks. Two months later the same event again occurred. He began the spree by taking 20 or 30 grains, and after that he didn't remember how much he took. His condition for the first week was the same as in the previous attack, but the speech defect, impairment of judgment and memory, and defect of vision persisted for four months. After prolonged hospitalization he was discharged, and will probably resume his former habit in the near future.

Case 2.—On four different occasions, Mrs. C. came under my care from overindulgence in veronal. The first time was when at a public social entertainment her husky voice, babbling speech, drooping lids, staggering and general incoherence, led her friends to believe that she had been drinking. After her removal to a hospital, she sank into semi-stupor and could scarcely be awakened for several days. She had a very weak pulse, slow respiration, and was indifferent to pricks of a pin or other stimuli. She confessed that on the day of her collapse she had taken a dozen five grain tablets of veronal, and that for a few weeks previously she had been taking three to five tablets for sleep. A few months later she was taken with a mysterious drowsiness in California, and was taken home in a very sluggish and incoördinate condition, being unable to walk alone or to talk clearly. This continued for ten days longer before I discovered a half empty bottle of veronal tablets in which she had been secretly indulging herself. On three other occasions, separated by intervals of years, she had recurrences of this indulgence, the last one, dial ciba having been used. She had several bottles of this drug concealed in various places about her house and two nurses who were in charge were unable to control her, because when one source of supply was discovered, she had recourse to other hidden bottles. It was only by her removal to an isolated part of the house to which she was rigidly confined, that the symptoms entirely cleared up. Within a year she died while abroad from a mysterious sickness, in which the symptoms of veronal poisoning played a large part.

Case 3.—A woman, aged 45, of the inadequate constitutional type, for years had been a semi-invalid, having had various physical complaints and having seen many doctors. She had had her gallbladder and appendix removed, and on another occasion a surgeon did a gastroenterotomy. Her complaints continued and are present today. Eighteen years ago she began taking veronal, and has taken it continuously since. About two years ago a change in personality began to be detected by her friends. She became depressed, complained more of her physical symptoms, lacked interest in anything except herself, and began to assume a melancholic trend. She persisted, however, in taking veronal against the advice of her friends and doctor. I saw her in March, 1928, for the first time. Her blood pressure was 100 over 70; pulse ranged from 100 to 120; there was a fine tremor of both hands; her pupils and reflexes were normal. Her speech was monotonous, and she had a constant drooling from the mouth. Mentally she was depressed, talked of suicide, and blamed herself for committing what she called moral suicide, and considered herself a degenerate, although she had always been a very modest proper person, and highly respected by her friends. She admitted taking from 7 to 10 grains every night. She refused to go to a hospital. She had a short time previously been in a sanitarium in the east for three weeks, where the veronal was restricted, and she claimed she could not sleep and was more nervous on this account. She was placed under a nurse's charge at home for two weeks, and veronal stopped. Her drooling gradually ceased, she became brighter, and more interested in things, and she gained eight pounds. She discharged the nurse at the end of that time and resumed taking veronal, and is doing so today. She only takes it now every third day, and her mental and physical condition has improved.

Case 4.—Mrs. F. had been for many years addicted to the use of morphine in large amounts. At various times she had tried to break herself of the habit by the use of veronal in large quantities. Then she had to break herself of the veronal habit by the use of morphine, which seemed to produce less obvious symptoms, and permitted her to again go into society. For many years she had tried this substitution of one habit for another, with the consequence that her tolerance for both morphine and veronal was largely increased. She came under my care during a period of veronal indulgence. When I first saw her she was profoundly somnolent, had double vision, talked with slurring speech, was unable to walk without assistance. For a time I was in doubt whether it was not a case of encephalitis, and it was only by the discovery by the nurse of concealed boxes of veronal tablets, the contents of which diminished each day, that the diagnosis of veronal addiction was confirmed. The removal of the sources of supply led to her gradual recovery from the most important of her symptoms, but on one occasion she had evidently secured a new supply of veronal. She became profoundly stuporous, with weak pulse, inability to articulate, or to swallow fluids, and with very shallow respiration. After remaining in this condition for about a week she died. I was never able to ascertain the amount of veronal that she was taking.

These four cases are examples of chronic poisoning, and illustrate the difficulty of treat-

ment outside of an institution or hospital. The most difficult problem of diagnosis was found in differentiating from encephalitis. Diagnosis at first is often impossible, unless a definite history is obtained, or evidences of veronalism are found.

Paraldehyde addiction is less common, and the reports in the literature are not very numerous. The physiologic action is very similar to that of chloral, but it causes less depression of the circulation and respiration. It is eliminated by the lungs and kidneys. It imparts a very characteristic and disagreeable odor to the breath. Tolerance is rapidly established. Not much is known of the fatal dose of this drug. One case has been reported in which death occurred after taking 6 or 7 drams, and in another 35 ounces caused severe, but not fatal, poisoning. Those accustomed to the use of paraldehyde can take enormous doses. Our experience has been that the same type of people taking veronal may also take paraldehyde and other drugs.

Case 5.—Mr. S., a lawyer, aged 51, was referred to me in 1922 by the late Dr. Sneve. He had suffered from anginal-like pain. He was found to have had lues, and Dr. Sneve had treated him for it with relief of his anginal pain. He suffered from insomnia, and the Doctor prescribed paraldehyde. He had used it for about six years at the time I saw him. He gave the appearance of a chronic alcoholic, his speech was thick, mentally he was sluggish, surly to his wife and friends, and neglected his practice. He retired at night with a six or eight ounce bottle of paraldehyde. He never measured the amount taken, but on waking up he usually took a good pull at the bottle. Frequently he consumed six to eight ounces a night. He could not sleep without it. He was placed in the hospital and remained there for six weeks, during which time he was taken off paraldehyde with a marked improvement. However, there seemed to be some mental impairment on discharge. He desisted for about six months, when he began to use paraldehyde on account of sleeplessness. He claimed no other drug sufficed. I saw him a few times at home. Finally after consuming over twenty-four ounces in three days, and while confined to bed in a stupor, he contracted pneumonia and died.

Case 6.—A man, aged 34, was first seen several years ago at the Ancker Hospital. He had been brought to the hospital in an unconscious condition. His pulse was feeble, his pupils contracted, he was cyanotic, and there was a strong odor of paraldehyde. After thorough lavage and supportive treatment he recovered consciousness in twenty-four hours, and in a few days was well. He had taken paraldehyde for about ten years. At times he drank a six ounce bottle a day, and went on regular sprees. He was readmitted several times in the same condition, the most striking symptom being his intense cyanosis. He finally died during one of these sprees while on my service at the Ancker Hospital.

Both these drugs are very valuable in psychiatric work, and in the cases of emotional instability. Under proper supervision they are harmless. However, both are habit-forming and we believe that of this fact the medical profession should be cognizant. We believe that measures should be taken to stop the promiscuous sale of drugs of this class. Probably the most simple and effective method would be to restrict the sale to prescriptions, not allowing refills on the original prescription.

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BIBLIOGRAPHY

1. Ehrlich: Münch. Med. Wchnschr., 1906, 53:559
2. Fischer and Hoppe: Münch. Med. Wchnschr., 1909, 56:1429.
3. Fornaca and Quärelli: Berl. Klin. Wchnschr., 49:2451, 1912.
4. Hartz: Jour. Am. Med. Assn., 58:625, 1912.
5. Hassin and Wien: Jour. Am. Med. Assn., 1920, 75:671.
6. Kress: Ther. Monatschr., 1905, 19:467.
7. Sands, J. J.: Jour. Am. Med. Assn., 1923, 81:1519.
8. Work, Philip: Arch. Neurol. and Psych., February, 1928.

DISCUSSION

Dr. L. H. Ziegler (Rochester): The problem of drug addiction resolves itself into two parts. Is the addiction due to some inherent characteristic of the person addicted, or is the craving for drugs due to some specific property of the drug? I think most drug addicts are psychopathic. The outstanding characteristic of such addicts is the tendency to relapse. Occasionally a normal person becomes addicted to opium or its derivatives. Such persons have withdrawal symptoms when the drug is taken from them, but they have very little tendency to relapse.

I agree that we should do what we can to prevent addiction. Much responsibility rests with physicians, especially the recognition of psychopathic persons whose affinities for drugs are highest.

Dr. E. M. Hammes (St. Paul): I wish to congratulate Dr. Ruhberg on the excellent presentation on drug poisoning. Any paper that deals with our shortcomings is timely, particularly if these result in some of the dire situations that have been pointed out. Veronal and paraldehyde are undoubtedly habit-forming drugs, and should be placed in the same category as narcotics and the same restrictions placed on their sale. Withdrawal symptoms in veronal and paraldehyde addicts are not as distressing nor as prolonged as in the narcotic group. The main symptoms we en-

countered were extreme restlessness, undue irritability, and a stubborn insomnia.

In going over the neurological records at the Ancker Hospital I found that eighteen cases of veronal addiction and seven of paraldehyde had been admitted since January, 1926. The record case was that of a young man who stated that he had taken on an average of 200 grains of veronal a day for the past fourteen months.

I want to add one personal experience of a chronic veronal addict. In 1914 a young man consulted me in whom we made a diagnosis of a mild paranoid dementia præcox. Among other things I gave him a prescription for 5 grains of veronal to be taken at bed time. I saw him again in 1926, twelve years later, and he had been most faithful in carrying out his treatment. He was still using veronal, gradually increasing the dose until he was taking from 25 to 45 grains every night, over a period of months. He presented a pitiful picture. He was sluggish mentally, his speech was thick and at times incoherent, he appeared slovenly, and had lost about 20 pounds in weight during the past year. The most interesting finding was that both pupils were dilated and did not respond to light or accommodation. His blood and spinal fluid were normal. He was placed in a hospital and some weeks after the withdrawal of the veronal his pupillary reflexes returned to normal. He has discontinued the veronal but still requires trional and sulfonal for his insomnia.

Another case was that of a nurse who took 150 grains of veronal with suicidal intent. She was incoherent, confused, and quite ataxic for about twelve days, and then gradually recovered.

IODIDE AND HEALTH

The extensive use of iodine in the prophylaxis of goiter has focused attention on the possible physiologic consequences of prolonged administration of this element. Hanzlik and his co-workers have made observations on rats. To an otherwise adequate ration, sodium iodide was added in amounts that corresponded to 3.3 mg. daily per kilogram throughout the major part of the life of the rats. This dosage would correspond to about 0.23 Gm. daily for an adult of 70 Kg. It was found that the continued administration of iodide in small daily doses in foods over long periods caused moderate though variable increases in weight and growth of the body in the majority of animals. The same tendency was indicated in rats on a deficiency diet. In contrast to the results obtained with iodide were those with sulphocyanate, bromide, arsenic, thallium and manganese. From these experiments there is no reason to believe that the prolonged use of iodide in small doses under ordinary conditions is detrimental. Hanzlik warns, however, that this would not apply to the continued use of iodide in specific conditions of the thyroid, or to large doses of the drug. (Jour. A. M. A., December 1, 1928, p. 1720.)

HEALTH APPEAL

The advertising writers of our progressive land have found the word "IT" in their profession means "Health Appeal." A cursory inspection of current periodicals indicates no lessening of the attention to the health angle. The folly of the all-or-nothing policy in foods, the ridiculousness of some of the arguments as to vitamin content, the preposterous claims for glorified antiseptics, the cautious venturings of time-tried tonics into the public field, and the dazzling claims of the promoters of light arouse the risibilities of the physician by their startling inconsistencies if not by their exaggerations. Who would have thought ten years ago that cigarets would be sold to the American public by insistence on the healthful qualities of certain brands? The manufacturers of Lucky Strike cigarets are promulgating a campaign in which they assert that these cigarets do not cut the wind or impair the physical condition, and that "Lucky Strike satisfies the longing for things that make you fat without interfering with a normal appetite for healthful foods." The human appetite is a delicate mechanism and the attempt to urge that it be aborted or destroyed by the regular use of tobacco is essentially vicious. (Jour. A. M. A., December 8, 1928, p. 1806.)

PREOPERATIVE TREATMENT OF EXOPHTHALMIC GOITER*

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EXOPHTHALMIC goiter, according to the "two-product hypothesis" of H. S. Plummer, is theoretically defined as a constitutional disease dependent on an unknown stimulus on the thyroid gland. It is associated with the production and delivery to the tissues of an abnormal thyroid secretion, and, in practically all instances, of an excessive quantity of normal thyroxin. The nature of the abnormal thyroid secretion is unknown. The progress of the disease is usually by exacerbations and remissions, and there is a tendency for the disease to cease spontaneously after running a course of from a few months to twenty years or more. Previous to the demonstration by H. S. Plummer of the value of Lugol's solution (compound solution of iodine, U. S. P.) in the treatment of exophthalmic goiter, the preoperative preparation of patients suffering from this disease consisted chiefly of two factors: rest, in an attempt, usually ineffectual, to husband the patient's strength, and a program of waiting until a natural remission should allow the patient to show improvement.

The two-product hypothesis offers an excellent basis on which to explain certain characteristics of the disease that are of greatest importance in explaining the results of what has already been proved to be the most efficient form of treatment. The phenomena of the disease which are dependent on abnormal thyroid secretion are the psychic status peculiar to exophthalmic goiter, the useless purposeful movements, stare, exophthalmos, and the gastro-intestinal crisis, with vomiting and diarrhea. These symptoms are associated with a more severe reaction than the symptoms referable to pure hyperthyroidism, and the patient who shows a predominance of the symptoms referable to the abnormal thyroid agent is always potentially in a condition that may be suddenly precipitated into an exophthalmic goiter crisis, the most serious status of the disease. During an exacerbation of exophthalmic goiter, these phenomena are more exaggerated than during a remission. The factor of true hyperthyroidism, that is, the part of the disease due to the production of an excessive normal thyroid secretion, is of much less importance in determining whether a patient is ready for thyroidectomy than the evidence in that patient of intoxication from the abnormal agent. These statements will explain why a patient with a high basal metabolic rate will often be in better clinical condition, and will be a lesser risk for thyroidectomy, than one with a low basal metabolic rate, if the clinical status is associated with a predominance of intoxication in the first case from excessive normal thyroxin, and in the second case from the abnormal thyroid secretion.

Since the value of the administration of Lugol's solution has become established, preoperative treatment of exophthalmic goiter has been revolutionized. The mortality in the medical treatment of the disease has been almost abolished. The time necessary for preparation for operation has been greatly reduced. The surgical mortality has been greatly reduced; according to data recently compiled by Pemberton, the surgical mortality in exophthalmic goiter for the year 1927 at The Mayo Clinic was 0.72 per cent. The necessity for preliminary surgical procedures, such as hot water injections and ligations, has been almost eliminated. Again quoting from Pemberton's data, in 1921, before the use of Lugol's solution was begun, the total number of ligations for exophthalmic goiter was 123 per cent of the total number of cases, in many cases two or more ligations being done; in 1926 and 1927, the number of ligations for each year was 0.6 per cent of the number of cases of exophthalmic goiter. The reactions to Lugol's solution have also offered invaluable information furthering the knowledge of exophthalmic goiter.

Following the administration of iodine in sufficient doses to patients suffering from exophthalmic goiter, certain changes are brought about with predictable frequency: Progress of exophthalmos is stopped, the stare disappears, and the characteristic psychic status and movements are abolished. If the patient is in crisis, the vomiting will be controlled within from twenty-four

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read at the Rock County Medical Society, Beloit, Wisconsin, March 27, 1928.

to forty-eight hours. The clinical improvement depends to some extent on the relative amount of abnormal secretion present in the individual case; that is, if the patient is manifesting the foregoing phenomena in association with abnormal secretion, great clinical improvement would be expected. If, however, the patient showed marked evidence of hyperthyroidism and fewer of the phenomena associated with an abnormal product, the improvement from iodine would be less. The latter are frequently classified with those who have suffered from the disease for a long time and in whom the gland is large and the basal metabolic rate high. In such case, the gland has probably been trained by long continued overstimulation to produce a relatively high proportion of normal thyroxin. The basal metabolic rate is usually high, and the drop in the rate following the administration of iodine is relatively small. Patients who are admitted for examination in crisis may or may not have extremely high metabolic rates; they usually show, in any event, a proportionately great drop after the administration of iodine. From clinical evidence, one may predict with considerable accuracy whether a small or great drop in basal metabolic rate will result from iodine treatment.

Inasmuch as the administration of iodine controls only one phase of the disease, exophthalmic goiter, it is necessary to complete the control. Thyroidectomy seems to be the method preferred from all points of view, mortality, morbidity, efficiency, and consumption of time in bringing about control. As has been said, the natural course of exophthalmic goiter is in waves. The administration of iodine does not change that course, but it does control one of the factors concerned. Thus if its administration is continued long enough and an exacerbation of the disease is imminent, the basal metabolic rate will rise after its initial drop. It is not justifiable to interpret this rise as due to the action of iodine. In fact, if iodine is continued the basal metabolism will drop and the intensity of the hyperthyroidism will subside when the natural course of the disease has progressed to this state. Patients are not infrequently observed who have been taking iodine constantly for several months or a year. They give a history of the usual exacerbations and remissions, but none of crisis if sufficient amounts of iodine have been taken. The patients are, as a rule, in better general health than would be expected considering the duration of the disease. Another group of patients not infrequently seen consists of those who have taken sufficient amounts of iodine for a long time, and then stopped it. Usually within a few days afterward symptoms associated with the abnormal thyroid agent appeared. Many patients grew worse rapidly, some of them reaching the gastro-intestional crisis after two or three weeks. Patients who have taken iodine continuously have kept the abnormal thyroid secretion of exophthalmic goiter under control, and are surely in much better condition than if they had not taken iodine, or had taken it intermittently; they also avoided the risk of being precipitated into a crisis. Patients who have gone into crisis after stopping the iodine may control it by resumption of iodine. The crisis could have been prevented by the continuation of iodine. The observation has been made repeatedly that cessation of iodine in a case of exophthalmic goiter will be followed, usually within from four to six days, by the reappearance of stare, characteristic movements, and psychic status, and a rise in the basal metabolic rate. This characteristic reaction and its counterpart, the control of such symptoms by iodine, are of great aid as diagnostic criteria in certain cases.

In the routine care of exophthalmic goiter, 30 minims of Lugol's solution daily is enough to control the symptoms attributed to abnormal secretion. Patients in crisis should receive larger doses, 50 to 100 minims daily, until the crisis status is under control. If Lugol's solution cannot be retained when taken by mouth, which is very unusual, it may be diluted freely with physiologic sodium chloride solution and given by rectum. It has been given satisfactorily by stomach tube to unconscious patients. If the patient is in crisis it is most important that Lugol's solution should be given in large doses, and retained. Following the foregoing regimen most patients will be ready for thyroidectomy within from eight to ten days; those who are first observed in crisis are held for a longer time, however. Cardiac decompensation, recent infections, and so forth, necessitate delaying operation for considerably longer periods. In such cases it is, of course, advisable to continue the administration of iodine without interruption.

Cardiac decompensation in cases of exophthalmic goiter is usually present only if there has

been preëxisting cardiac injury. Auricular fibrillation is a common accompaniment, occurring in 22 per cent of cases. The effect of iodine is frequently striking. The slowing of the pulse, diminution of pulse deficit in cases of auricular fibrillation, and the mobilization of fluids with loss of ascites, hydrothorax and edema, are produced with great rapidity. Only rarely is the use of digitalis necessary or advisable. Since H. S. Plummer has demonstrated the frequent unfavorable effects of digitalis in cases of hyperthyroidism, it has been used in The Mayo Clinic only in rare instances, chiefly in cases in which cardiac decompensation progressed in spite of other therapeutic measures.

Patients suffering from infectious processes, particularly respiratory infections and exophthalmic goiter, are strikingly benefited by iodine. The crisis status apparently reduces resistance against acute infections and the reactions to infection in that state are extreme. Iodine, in controlling the crisis status, permits rapid recovery from the infectious process unless it is too extensive or too far advanced.

Since the institution of iodine, prolonged periods of rest in bed have become unnecessary and inadvisable. Patients lose much strength from the disease, and if this loss is increased by confinement in bed, they may become so weak as to be unable to sit up without help. In extremely severe cases a degree of weakness is reached that makes it impossible for the patients to be out of bed. It is advisable for all patients that are not too weak to be out of bed. In this way much greater general strength is maintained. Patients suffering from cardiac decompensation or acute infections are, of course, kept in bed.

There seems to be no valid reason for restriction of the diet. A diet up to 5,000 calories daily is allowed and no particular article of food is restricted except coffee; thus nutrition is maintained. Most patients on this diet and iodine will soon begin to gain weight.

Iodine in itself should not be considered sufficient for the complete control of exophthalmic goiter. Rarely complete control will be secured in this manner, but in such cases the condition is usually in or near natural remission. If operation is postponed, the patient should be kept under careful surveillance, so that at the first evidence of uncontrolled hyperthyroidism, thyroidectomy may be performed. It is, however, extremely unusual for a case to be so controlled and in the usual case a great injustice is done if further efforts are not made to complete the control of the disease. In the most serious cases, those in which prognosis as regards functional result and surgical mortality is most unfavorable, the disease has existed for a long time. Therefore, it is of great importance that the disease be completely controlled as quickly as possible. Fortunately, patients are now coming for treatment earlier than ever before, and consequently the end-results of treatment will be better. Quoting from Pemberton's statistics, in 1909, the average duration of the disease in patients who came to The Mayo Clinic was thirty-one months. The duration has been steadily decreasing so that in 1927 it was fourteen months. In 1909, only 45 per cent of the patients had had the disease for twelve months or less, whereas in 1927, 77 per cent were in this group. These figures are as reassuring in regard to the morbidity as they are in regard to the surgical mortality. In closing, I wish to emphasize two points:

1. In any case of exophthalmic goiter it is of greatest importance completely to control the disease as quickly as possible; almost invariably this cannot be achieved by iodine alone.

2. The uninterrupted use of iodine should be urged until patients recover from the disease. In any case in which thyroidectomy must be postponed temporarily, the patient should at least be given the advantage of having the most serious phase of the disease kept under control.

BIBLIOGRAPHY

1. Pemberton, J. de J.: Personal communication.
2. Plummer, H. S.: The function of the thyroid gland. Beaumont lecture. Collected papers of The Mayo Clinic, 1925, xvii, 473-499.
3. Willius, F. A., Boothby, W. M., and Wilson, L. B.: The heart in exophthalmic goiter and adenoma with hyperthyroidism. Med. Clin. N. Am., 1923, 189-219.

FOREIGN BODIES IN AND NEAR JOINTS*

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THE following twenty-one cases were seen during a twenty-year period in the private practice of orthopedic surgery. Cases of this type are therefore quite rare, but nevertheless frequent enough to merit some attention. In a considerable percentage of the cases, the presence of the foreign body was unsuspected by the patient.

None of these cases were "war" or "army" cases. Nearly all of us, of course, have seen many such ten years ago. The cases here cited occurred during ordinary, routine, civilian life.

It was interesting to note that in four of the cases in which the foreign body had been present for a long time a condition of chronic arthritis had developed in the affected joint. Very probably it would not have occurred had the presence of the foreign body been recognized earlier and if it had been removed in time.

In a number of the cases the patient complained of joint trouble and came to the office with another diagnosis (tuberculosis, gonorrhea, fracture). Twenty-one cases are reported in this series. Of these cases there were nine in which the presence of the foreign body was unsuspected.

The knee joint was involved in twelve cases, the foot in five cases, and the remaining cases were scattered among other joints.

The foreign body was removed in twelve cases. Its removal was advised against in seven cases for the following reasons: In four cases an arthritic process was so pronounced that it was deemed that removal of the foreign body would not give the patient any relief; in the three other cases, removal of the foreign body was advised against because it seemed to lie quiescent and was not causing any trouble; in two cases, removal of the foreign body was advised but the patient did not choose to be operated upon.

The character of the foreign bodies found in these twenty-one cases was as follows:

	Cases
Needles	11
Bullet	3
Wire	2
Glass	2
Miscellaneous	3

The presence of foreign bodies in the joint usually causes discomfort and symptoms and the removal of them is usually indicated.

These twenty-one cases can be divided into fresh and old as follows: fresh cases (one day to three months), six cases; old cases (three months to thirty years), fifteen cases.

When a foreign body, such as a needle, has entered a joint or its vicinity, there is no immediate hurry for its removal, unless symptoms of infection are very evident. As a rule it is better to put the joint at rest and to wait a few days while keeping the patient under careful observation. When, however, it is definitely known that other foreign materials, such as thread, pieces of clothing, etc., have entered with the metallic object, then the waiting policy is to be condemned, and immediate search must be made for all of the foreign bodies that may have entered.

Case 1.—A metal worker came with the diagnosis of gonorrheal synovitis of the wrist. He was at that time suffering from an acute exacerbation of chronic gonorrhea. His wrist was swollen, painful, and the motions were limited. There was some local heat. A roentgenograph was made. This showed the presence of a small, triangular piece of metal opposite the lower end of the radius. The patient did not remember having had any accident. The foreign body was removed and the symptoms in the wrist joint promptly abated.

Case 2.—This patient had injured his wrist during a fall a few days previously and a fracture of the styloid process of the ulna was suspected. The roentgenograph showed no fracture, but, instead, the broken-off pointed end of a needle lying transversely on the ulnar side of the wrist joint. The needle was easily removed under local anesthesia. Its presence was suspected by the patient.

Case 3.—This man complained of his right hip. Two years previously he had fallen down backward, striking his buttock on a pointed stick of wood. He said he believed that the portion of the wood had entered the buttock and he complained of pain on certain motions, especially inward and outward rotation of the leg. On careful palpation the foreign body could be easily felt in the depths of the right buttock. *X*-rays

*Presented before the Southern Minnesota Medical Association, Rochester, Minn., Oct. 3, 1928.

disclosed nothing. It was advised to remove the offending foreign body, but the patient refused operation.

Case 4.—This patient complained of pain in the left foot. Certain motions elicited more pain than others. When the patient was off the foot it did not bother him, but prolonged use would cause swelling in the region of the astragalo-scaphoid joint. *X*-rays disclosed the broken-off end of a needle, about one-half inch long, situated immediately below the astragalo-scaphoid joint. On seeing the *x*-ray, the patient remembered stepping on a needle thirty years previously. Removal of the needle was followed by the immediate cessation of the symptoms.

Case 5.—This was a man about twenty-two years old, who was thrown from a horse about four months previous to examination, while in Texas. He stated that he was thrown into a bush, a variety of cactus, called Spanish Bayonet. He thought he injured his left elbow at the time, although he found no marks there. Ever since the accident the elbow had a tendency to swell for a few days at a time in the region of the external condyle. Motion would become somewhat limited and there was a tender spot immediately over the outer side of the elbow joint. *X*-ray in this case disclosed nothing. On careful palpation, however, it was thought that one could feel a sharp spicule. There was increased tenderness in this region on pressure. An exploratory operation was advised and performed. It was found that a sharp thorn had pierced the capsule of the joint. The point of this thorn was protruding freely into the joint cavity while the balance of it was embedded in the capsule. Its removal was followed by immediate cessation of the symptoms. The presence of this foreign body was not suspected.

Case 6.—A young woman, twenty years old, was scrubbing the floor when she noticed a sharp pain in her left knee. On inspecting the knee she found a black thread emerging from the region of the knee joint on the inner side of the patella. We saw her a few hours later, and on account of the presence of the thread immediate removal of the foreign bodies was advised and performed. The needle had not entered the knee joint proper and rapid healing ensued.

Case 7.—A young lady twenty-two years old complained of occasional pain in the popliteal space. *X*-ray disclosed a portion of a needle three-fourths of an inch long toward the outer side of the popliteal space. Its removal was advised but was not consented to, probably because we warned the patient that it would be a difficult and somewhat serious operation to find this needle. The patient did not remember when the needle found entrance.

Case 8.—This was a man about thirty years old who was shot with a twenty-two caliber bullet at the age of four. The foreign body had been present for twenty-six years. *X*-rays showed it situated in the external condyle of the knee near the joint surface. The knee had not given any trouble until three or four years previously, when there was a slow onset of pain and some swelling. The symptoms were increasing in severity when the patient consulted us. On examination the knee was somewhat swollen, limited in motion and quite tender. The *x*-ray showed, in addition to the bullet, a considerable amount of arthritic changes. In view of the very evident condition of arthritis present, it was felt that the removal of the foreign body would not relieve the symptoms. It was a question whether the presence of the bullet had anything to do with the onset of arthritis in this knee but the comparative youth of this patient, the absence of history of any other injury and obvious presence of foreign body in the bone close to the joint surface make it seem probable that the arthritic condition was due to the presence of the foreign body.

Case 9.—This is one of the most interesting cases of this series. An old lady, sixty-two years old, complained of her knee. For about thirty years the knee would become acutely painful at times, it would swell and the symptoms would then abate, the knee feeling quite normal during the intervals. She would have on the average two or three attacks during the year. Every year she would spend some time at various baths and watering resorts for the "cure" of her supposed "rheumatism." During all of these years nobody had ever thought of taking *x*-rays. The one which we took revealed a needle lying immediately beneath the patella which was broken into three distinct pieces. After the removal of these broken fragments under local anesthesia, there was a cessation of the symptoms and the woman was cured of her "rheumatism."

Case 10.—This case was of a boy, ten years old, who five days previously had been accidentally shot by a twenty-two caliber bullet. On the *x*-ray, the bullet seemed to be lying freely in the knee. The boy was put to bed and was watched for one week, during which time the wound of entry had healed completely and a normal temperature prevailed. When it was practically certain that no infection had supervened the knee joint was entered in an aseptic manner and the bullet was easily removed. This was one of the few "fresh" cases in this series.

Case 11.—A woman forty-five years old faintly remembered that as a young girl she had, during scrubbing, gotten a needle in her knee joint. It did not give her any trouble until about two years before consulting us. Her symptoms were pain in the knee and occasional slight swelling. On examination, the knee was slightly swollen and some limitation of motion was present which was accompanied by considerable creaking. *X*-ray showed not only a piece of needle about three-fourths of an inch long lying between the condyles of the femur but also numerous arthritic changes. This woman was advised to have no surgical operation, it being quite apparent that the arthritic condition, solely, was the cause of the symptoms and that the removal of the needle would not benefit her condition. The question is whether the arthritic process was the result of the presence of the needle. No other joints were arthritic. It seems probable that the arthritis was of a traumatic nature and that it was due to the presence of the needle.

Case 12.—In his case the boy was fifteen years old. It was not known when the needle entered his knee joint and its presence was not suspected by the patient.

Six days before consulting us, there was sudden swelling in the knee which was preceded by a sharp pain which quickly receded. *X*-ray demonstrated a portion of a needle about one inch long in the knee joint. On examination there was considerable joint effusion, some limited motion and some local heat. Immediate removal was advised but not consented to by the parents and the case dropped out of sight.

Case 13.—This also is a case of a needle in the knee joint. The patient did not remember having the accident or how long the needle may have been present. *X*-ray showed the piece of a needle about one-half inch long lying in the region of the internal condyle. The *x*-ray showed in addition marked arthritic changes, not only in the affected knee joint but also the beginning of arthritic changes in several other joints. On account of the arthritis present, operation for the removal of the needle was advised against. In this case the needle probably had nothing to do with the arthritic symptoms.

Case 14.—A man twenty-three years old had been shot in the leg four years previously by a pistol. *X*-ray showed the bullet lying embedded in the lower end of the femur. Surrounding the bullet there was an area of marked bone absorption. His symptoms were pain, tenderness and swelling which had been practically constant with only a few short intermissions ever since the injury. There was no temperature and the synovitis present seemed to be due to the irritation of the bullet lying within the bone. The removal of the bullet was advised but not consented to.

Case 15.—This case involved the acromio-clavicular joint. Two and one-half years previously the patient had sustained a fracture of the distal end of the clavicle. A surgeon had inserted a wire to hold the broken ends together and had run the wire through the above mentioned joint. The fracture healing was perfect but pain and swelling persisted in this joint. On *x*-ray examination it was found that the wire had broken where it passed through the joint and the patient was advised to have it removed. This was done with complete cessation of the disagreeable symptoms.

Case 16.—This patient was a man sixty-five years old. Fifteen years previously he had sustained a fracture of the patella which was wired by a surgeon. The fracture had nicely healed and the patient was ordinarily comfortable; at times, however, he had occasional sharp pains in the knee during the last few years. It was a condition of chronic swelling and pain in the knee joint, and motion was also becoming more limited. The *x*-ray showed that the wire had broken and that there were four strands of it loose within the knee joint situated at different points. In addition there were considerable arthritic changes. In view of the arthritis present, operation was advised against as it was felt that the arthritis was the chief source of the present complaints. I believe that the arthritis was due to the wire lying loose in the joint cavity.

Case 17.—A man twenty-five years old had three years previously stepped on a phonograph needle. For a time following the accident, there were no symptoms but within six months there was pain over the head of the third metatarsal. Numerous braces were tried with indifferent results. The *x*-ray clearly showed the needle situated below the head of the third metatarsophalangeal joint and it was easily removed with cessation of symptoms.

Case 18.—Six years previously the patient, fourteen years old, had stepped on some glass which entered the heel of his foot. He had occasional pain and *x*-ray nicely showed the glass fragment, which was one-fourth of an inch long. Its removal was easy and followed by relief of symptoms.

Case 19.—This patient, thirty years old, is practically a duplicate of the preceding one. A piece of glass was found in the plantar structure of the foot, it having been present for three years, causing occasional symptims of pain. In this case operation was refused.

Case 20.—This case was a child, three years old. While sliding on the floor the day before, she had run a needle into the popliteal region of her left knee. Examination on the following day showed a one-half inch broken-off end of a needle lying immediately behind the knee, apparently not giving her any discomfort. The knee could be flexed and extended normally, on which account the waiting policy was advised. At the present time (eight years later), the father writes me that the foreign body has not been removed and that the knee has never shown any signs of trouble since the time of examination. Removal of the needle from the posterior portion of the knee joint is rather a difficult operation, and in this particular case the waiting policy was certainly the correct one.

Case 21.—A child five years old was referred to me as a case of tuberculosis of the knee, coming to the office with the leg in a plaster of Paris cast, extending from the groin to the ankle. On removing the cast, we found the knee slightly swollen. There was some local heat, much limitation of motion and considerable atrophy of the thigh muscles. The cast had been worn for six weeks. Clinically, it certainly looked like a typical case of tuberculosis of the knee joint. The *x*-ray disclosed a needle one and three-quarters inches long within this child's knee. The parents were informed that it was necessary to remove this needle. The patient was sent to the hospital the night before the operation and the knee prepared; the cast was not re-applied. On the following morning the child was found in bed, playing merrily and bending its leg in a normal manner. Lying on the bed clothes was the offending needle which had been extruded during the night, on account of the bending of the leg, and only a few drops of blood on the dressings showed what had happened.

SUMMARY

1. Twenty-one cases are here reported; in nine of these the presence of the foreign body was not known or even suspected by the patient until the roentgen ray revealed it.

2. These are all civilian cases.

3. Arthritis supervened in four cases in

which the foreign body had been present for a period of years. This ought to justify us in removing foreign bodies that are lying, for the time being, quiescent, within or very near the joint cavity.

4. In one-half of these cases, the foreign body was a needle.

5. Wire is to be used with caution in the repair of joint fractures; preferably, it should be removed when it has fulfilled its allotted task. Its prolonged presence in the joint cavity may cause synovitis and arthritis.

DISCUSSION

Dr. M. S. Henderson (Rochester): We are indebted to Doctor Geist for bringing to our attention a subject that is conspicuous by its lack of mention in the medical literature. The term "foreign body" in respect to the knee-joint is oftentimes used without discrimination; we must remember that Doctor Geist is talking only of real foreign bodies, and not of loose pieces of cartilage or bone in the joints.

It is astonishing how often these bodies are discovered accidentally, particularly in the feet, the patients being unaware of their presence. Such may be the case, for example, if a patient has run a needle into his foot and a piece of the needle is left in, though the patient believes that it was entirely removed at the time of injury.

As Doctor Geist has emphasized, it is not necessary to remove all these bodies; if they are causing no symptoms, they should usually be left alone.

It is not always easy to find and remove these bodies; whenever it is possible, and it usually is possible, for most foreign bodies are found in the extremities, a tourniquet should be used, so that the surgeon will have a dry, clean field to work in. Neglect to do this will often result in failure, much to the chagrin of the surgeon and the disappointment of the patient. Most surgeons with experience can tell about humiliations associated with the search for foreign bodies; after prolonged search has been made, and hope of locating the body is about given up, it may suddenly be discovered in some unlooked-for place, or may pop up into the wound. Instances have also been mentioned wherein the body has been wiped up in a piece of gauze.

I know of no type of operation that should be approached with more careful preparation than this, particularly as to the location of the body by careful *x*-ray examination, the pictures being taken in at least two places. If possible, stereoscopic plates should be taken also, and it is well to have the fluoroscope at hand.

THE NATURE OF PEPSIN

Most of the efforts to "purify" enzymes have resulted in the separation of products bearing the characteristics of proteins. This has been conspicuously true of the amylolytic group. It appears that the higher the degree of purification of the amylases, the more nearly do they approach the proteins in composition and properties. Not long ago it was shown that pepsin of high proteolytic power can be obtained by isoelectric precipitation. At pH 2.5, products showing a proteolytic potency of 1:65,000 were secured. The analyses of these products are characteristic of a protein. All fractions still possess proteolytic properties until they reach the stage when they are sufficiently small to diffuse through parchment or animal membranes. The gradual decrease of proteolytic activity of the enzyme itself is paralleled by loss of its complex protein characteristics. (Jour. A. M. A., December 29, 1928, p. 2069.)

CHEMICAL EXAMINATION OF SALYRGAN

G. W. Collins reports work carried out in the A. M. A. Chemical Laboratory for the Council on Pharmacy and Chemistry on Salyrgan. He reports that in various journals, periodicals and textbooks a structural formula is given for the compound which differs from that used by the distributor of the product. The theoretical percentage of mercury of neither formula agreed with that given by the manufacturer. The examination disclosed that the formula used in the German literature was incorrect and that that of the manufacturer is correct. The product was found to be a definite chemical compound and of good purity. On the basis of examination, tests and standards were drawn up: these were agreed to by the manufacturer and are used in the New and Non-official Remedies description adopted by the Council on Pharmacy and Chemistry. (Jour. A. M. A., December 22, 1928, p. 1994.)

DELAYED TRAUMATIC INTRACRANIAL HEMORRHAGE*

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DELAYED traumatic intracranial hemorrhage can be divided into two large groups. The first group includes those cases in which the hemorrhage occurs within the cerebral substance, and which are classified as traumatic late apoplexy. In the second group the hemorrhagic lesion is extracortical, either extradural, due to a ruptured middle meningeal artery, or intradural and usually of venous origin, giving rise to the true chronic subdural hematoma.

In the traumatic late apoplexies the time interval between trauma and the delayed cerebral symptoms varies from several hours to days and even months. Brandes reports a case in which apoplectic symptoms developed 10 years after a head trauma and in which post-mortem examination revealed a ruptured cerebral aneurism in proximity to an old hemorrhagic cyst. In cases of true traumatic delayed apoplexy all other etiologic factors, such as cardio-vascular, nephritic, luetic, or alcoholic, have to be excluded. The accepted theory is that at the time of trauma some lesion of an intracerebral blood vessel, such as an injury to one of the vascular coats, results with a subsequent aneurismal formation and rupture. The most frequent location of the hemorrhage is either in the wall of one of the ventricles or in the basal ganglia. Because these deep-seated areas are involved, and because the massive hemorrhage usually terminates fatally, this group of cases does not offer the same clinical interest to the neurologist, and especially to the surgeon, as the second group, the extra- and subdural hemorrhages. Early diagnosis, correct localization, and prompt surgical interference in this group offer a favorable prognosis in a large percentage of cases.

The extradural hemorrhage, due to a rupture of the middle meningeal artery, usually presents quite a typical picture and does not offer the diagnostic problems encountered in the chronic subdural hematomas. In the former group we find that associated with the head trauma there may or may not be a short period of unconsciousness. Subsequent to this there is frequently a clear interval of several hours to several days, following which symptoms of rapidly increasing intracranial pressure develop, such as severe headache, drowsiness, bradycardia, emesis, and so forth. Accompanying this or within a short period phenomena indicative of cortical irritation manifest themselves, such as localized muscular twitchings, Jacksonian convulsions, an incomplete hemiplegia more marked in one extremity, along with the usual pathologic reflex changes. When the head trauma is sufficiently severe to produce marked cerebral concussion with prolonged unconsciousness no lucid interval occurs. In these cases the increasing stupor and the bradycardia, particularly if the slow pulse manifests itself only after several hours and is continuous, are the two most significant symptoms suggestive of increasing intracranial tension and hemorrhage.

The spinal fluid in uncomplicated cases is under increased pressure, clear, and contains no evidence of blood. Following spinal drainage one frequently notes a temporary clinical improvement.

Case 1.—Ruptured Middle Meningeal Artery with Time Interval of Three Days and Eight Hours.

This case was that of a boy, aged 16, admitted to my neurological service at the Ancker Hospital, St. Paul. His family and personal history were negative. He stated that about 11 a. m., four days previous, while exercising on a trapeze, he fell a distance of about 7 feet and struck his head on a cement floor. He was dazed for a few minutes, soon recovered, felt well, and attended to his regular duties for three days. On that evening, 80 hours after his accident, while watching a prize fight, he became quite excited and suddenly developed an excruciating headache. This was so severe that immediate hospitalization was necessary. He had a restless night. The following morning at 8 o'clock he was rather sluggish mentally. His temperature was normal, pulse 70; blood pressure, systolic 120, diastolic 70; blood count and urine were normal. His neurological examination was negative throughout except for a slight weakness of his right facial muscles. At 9:30 a. m. he was quite stuporous and manifested some weakness of his right arm and right leg. A lumbar puncture was performed and 40 c.c. of clear spinal fluid under **increased pressure** were removed. The

*Read before the Northern Minnesota State Medical Association, August 22, 1928, and before the Minnesota Academy of Medicine, November 14, 1928.

spinal fluid was normal throughout and there was no evidence of blood. He aroused somewhat but after a few hours again became unconscious and by evening his right hemiplegia was quite definite. His condition remained unchanged during the night. His pulse varied between 52 and 70. A diagnosis of left middle meningeal artery hemorrhage was made. A decompression over the left parieto-temporal region was performed by Dr. John T. Rogers. A large recent extradural hematoma was found. After its removal it was noted that the hemorrhage came from a ruptured branch of the middle meningeal artery. This was ligated, the bony flap replaced, and the wound sutured. Recovery was uneventful and the patient was discharged from the hospital on the twentieth day.

Rarely one encounters a case of subdural serous effusion or a localized cerebral edema secondary to head trauma which closely simulates a chronic subdural hematoma or a hemorrhage due to a ruptured middle meningeal artery. Localized edema of the brain itself may occur due to nephritis with hypertension, resulting in headache, hemiparesis, choked disc, and coma. This may be influenced by regulating the fluid intake and output, as has been recently pointed out by Holmes.

Spurrell reported a case of localized cerebral edema secondary to head trauma. Following an injury to the head without unconsciousness, this patient complained of headache and irritability for one week. On the ninth day she developed Jacksonian convulsions. A decompression operation revealed a marked localized cerebral edema but no evidence of hemorrhage. The following case might come under this group because of the rapid recovery and no subsequent development of symptoms. As the patient recovered without operation the diagnosis remains problematical.

Case 2.—Probably Localized Cerebral Edema Simulating Middle Meningeal Artery Hemorrhage.

This case was a little girl, aged 4, seen in consultation with Drs. O'Brien and Teisberg in August, 1924. The following history was obtained from the mother: She saw the patient walk upstairs at about 5 p. m. About a half hour later the mother heard someone crying outside and upon investigating found the little youngster lying on the cement sidewalk, conscious but crying. The screen on the second story window above had been pushed out and evidently the little girl had fallen out of this window to the sidewalk below. There were some abrasions over her left fronto-parietal region. Upon examination nothing serious was found and she appeared quite well for three hours. She then developed some twitching of her right face and arm. This gradually became more pronounced and she soon became unconscious. At about 9 p. m. she was stuporous and had constant twitchings of her right face, arm, and leg. Her pulse was 130, respiration rapid and slightly irregular. Because of her marked twitchings, the neurological examination was unsatisfactory, although the deep reflexes on the right side were increased and she had a right ankle clonus and a positive Babinski reflex. A diagnosis of a ruptured left middle meningeal artery was made and an immediate decompression advised. However, Dr. O'Brien felt that a little delay might be advisable and it was decided to perform a lumbar puncture. About 45 c.c. of clear spinal fluid under increased pressure were removed. This was normal throughout. Almost immediately following the spinal drainage the convulsive seizure ceased, the breathing became regular, and her pulse improved. Within thirty minutes she appeared to be sleeping normally. She had a restful night. Upon awakening the following morning her general condition was good and she was bright mentally. A neurological examination about 9 a. m. was negative throughout except for a right positive Babinski reflex. She had a marked ecchymosis around the region of the left eye. She made an uneventful recovery without further lumbar punctures and has remained perfectly well.

Kowalewski has pointed out that in childhood the dura is more adherent to the skull and the areas of fixation are larger than in later years. In this case this fact might account for a small localized extradural hemorrhage without subsequent symptoms instead of a localized cerebral edema.

Chronic subdural hematoma differs from other forms of intracranial hemorrhage in that the bleeding usually is of venous origin. The venous sinuses, the lacunæ, and the tributaries of the veins of the pia are most frequently involved, especially in the parietal region. The hematoma is bilateral in from one-third to one-half of the cases, and lies beneath the dura but external to the arachnoid. It may vary from a microscopic ecchymosis to a large pancake-like tumor compressing the cerebral cortex. A history of head trauma is quite frequent. The injury may be very slight and apparently insignificant or so severe as to render the patient unconscious for several hours or longer. Trotter suggests that the frontal and occipital blows are more provocative than those in the parietal regions, because the brain is supported against lateral violence by the falx cerebri. The symptoms are extremely variable, irregularly progressive with definite fluctuations in the clinical picture. This in itself is quite significant. The patient may be symptom-free for a period of hours or days or months, or may have indefinite complaints, such as headache, insomnia, and vertigo, from the time of the accident. Early

psychotic symptoms such as undue irritability, restlessness, perversity, or mental sluggishness are not uncommon. Evidences of increased intracranial pressure gradually manifest themselves, along with localizing irritative signs—twitchings, paralysis, cranial nerve involvement, and so forth. Sometimes paralytic or irritative symptoms occur bilaterally in a single lesion, but more often a bilateral hematoma produces symptoms on one side only.

The spinal fluid is usually clear, sometimes xanthochromic, frequently under increased pressure, and may contain a few red blood cells. One occasionally notes a temporary improvement following spinal drainage. Subdural hemorrhagic extravasations are not uncommon in the chronic alcoholics and the chronic insane, especially in general paresis. This condition has been classified as pachymeningitis hemorrhagica interna. According to Griswold and Jelsma, and others, this is identical, both clinically and pathologically, with the chronic subdural hematomas. One frequently is unable to obtain a history of trauma due to the patient's mental state or because the injury was slight and produced no external evidence. The following cases are illustrative:

Case 3.—Subdural Hematoma with a Two-Hour Interval.

A boy, aged 15, was seen in consultation with Dr. A. Gratzek, June 10, 1928. His family and personal history were negative. The father stated that at about 4 p. m., June 10, 1928, while the patient was playing base ball a batted ball on first bounce struck him a glancing blow on the left side of the head. He continued playing for three more innings, which ended the game. He complained of a slight headache but appeared well otherwise. Two hours later he seemed somewhat drowsy and confused. Soon after he became stuporous. At 8 p. m. he was comatose. His right pupil was markedly dilated, left normal; neither responded to light or accommodation. All deep and superficial reflexes were absent. There was no Babinski reflex. All four extremities were flaccid. *X*-ray of the skull was negative. There were no superficial abrasions. His temperature was normal, pulse 130; blood pressure, systolic 120, diastolic 70. The spinal fluid was under moderatedy increased pressure; 40 c.c. were removed. It was clear and normal throughout. There was no improvement following spinal drainage. Because of his serious general condition and in the absence of any localizing signs an immediate decompression operation did not seem justifiable. He died quite suddenly at 5 a. m.

A post-mortem examination revealed a large recent subdural hematoma over the left parietal region. All other findings were normal.

Case 4.—Subdural Hematoma in a Case of Delirium Tremens with Five-Day Interval.

This patient, 46 years of age, was admitted to the neurological service at the Ancker Hospital from the police station. He had been arrested three days previously for drunkenness and during the past twenty-four hours had become delirious and hallucinatory. He had a small superficial abrasion over his right forehead which was said to have been produced by bumping his head against the iron bars while in jail. He presented the ordinary picture of delirium tremens with tremors, extreme restlessness, marked hallucinations of sight, and delirium. His temperature was 99.8, pulse 118, general condition good. The neurological examination was negative except for increased knee jerks. The spinal fluid was under slight pressure but normal otherwise. He gradually improved and on the fifth day was quite clear and able to walk to the toilet with assistance. While there he suddenly had a generalized convulsion. He had two more during the night and died the following morning. No pathologic reflex changes or paralysis were noted at any time.

Post-mortem examination revealed a bilateral subdural hematoma extending over both cerebral hemispheres, a chronic myocarditis, and chronic nephritis.

Case 5.—Chronic Subdural Hematoma with Time Interval of One Month.

This case was a farmer, aged 54, seen in consultation with Dr. Alva A. Conley, Cannon Falls, Minnesota, on May 23, 1928. His family and personal history were negative. On April 9, 1928, the patient fell from a ladder, a distance of 10 feet, on a cement floor, injuring his left hip and left chest. He has no recollection of striking his head, although he was unable to get up for about fifteen minutes afterward. He again climbed the ladder and finished his chores. He first consulted Dr. Conley April 13, four days after his accident, because of pain in his left hip and left chest. Nothing serious was found except superficial bruises and there were no complaints suggesting a head injury. He returned to work April 15, and continued until May 17, during which time he painted his barn, climbed ladders, and so forth. On May 17, he again consulted Dr. Conley because of general weakness, slight headache, and marked dizziness. His pulse was 58. His wife stated that since May 11 he had seemed somewhat sluggish mentally at times and a little awkward with his right arm. The time interval between his accident and the first symptoms suggestive of an intracranial lesion was at least thirty-one days.

On May 21 he manifested a partial motor paralysis of his right arm and leg. He was drowsy and answered questions slowly but correctly. The reflexes were normal. On May 22 the paralysis was more pronounced. Both knee and ankle jerks were markedly increased. He had a bilateral ankle clonus and a positive Babinski. There was a positive Kernig sign and a moderately rigid neck. He complained of severe occipital pain radiating down his right arm to the elbow, most pronounced in the right shoulder. On May 23 his general condition and neurological findings were the same. The fundi were normal; blood pressure, systolic 148, dias-

tolic 70; urine normal; pulse 54. The spinal fluid was under increased pressure, clear, and normal throughout except for a slight increase in sugar (106 mg.) Forty c.c. were withdrawn. Following the spinal drainage he had a definite improvement of all symptoms. His headache was relieved, the right hemiplegia had lessened, and he was brighter mentally. After three days there was a gradual return of these symptoms, particularly the severe headache. He was admitted to Mounds Park Hospital on June 2. An *x*-ray of the skull was negative. His neurological findings were similar to previous examinations. On June 3, 45 c.c. of clear spinal fluid under increased pressure were removed. Again his headache subsided and he was able to move his right arm and right leg quite normally. Two more lumbar punctures were done. On June 6, four hours after a spinal drainage—15 c.c. of yellowish spinal fluid had been removed—the patient gradually became drowsy and finally stuporous. During the period of observation a diagnosis of subdural hematoma had been made by Dr. Kamman and myself, and operation advised, but the family was reluctant to submit to it as the patient seemed to be improving with spinal drainage. However, on June 7 a bone flap operation over the left parietal region under local anesthesia was performed by Dr. Robert Earl. The dura was bulging and of bluish-greenish appearance. Upon opening the dura an organized hematoma about 10 cm. in diameter and about 2 cm. in thickness was found over the motor area extending anteriorly toward the frontal region. The hematoma was enclosed in an evelope of fibrous tissue and peeled off without difficulty. In the center of it was an organized fibrous sac filled with a dark brownish fluid. The brain was markedly compressed but appeared normal. The wound was closed, the patient did not regain consciousness, but died eighteen hours after the operation. No postmortem was permitted.

The pathology of the subdural hematoma is of interest. The hematoma is frequently enclosed by a fibrous membrane. On the side toward the arachnoid this is thin and covered with mesothelium. On the dural side it is more dense and composed of organizing granulation tissue containing large mesothelium-lined spaces filled with blood and fibrin. The greenish hue on the surface of the hematoma which is occasionally observed is due to a high concentration of bilirubin. The hematoma itself is composed of masses of organized tissue, of areas of well preserved red cells with no fibrin, of heavy fibrin mesh, and of collections of serum or hemolyzed cells.

Case 6.—Probable Subdural Hematoma with Time Interval of 31 Hours. Recovery with Repeated Spinal Drainage.

This case was a boy, aged 19, seen in consultation with Dr. Scott McClanahan, White Bear, Minnesota, July 4, 1928. His family and personal history were negative. On July 3, 1928, at 9:30 a. m., he was given a typhoid vaccination by Dr. McClanahan. He walked to the drug store below the Doctor's office and while telephoning fainted and struck his head on the wooden floor. He soon regained consciousness and felt well except for a dull headache until 5 p. m. the following day, thirty-one hours after his accident. He then noticed some twitching of the second and third fingers of his right hand. This gradually became more pronounced and soon after he had a typical Jacksonian convulsion involving his right arm, face, and leg. These convulsions increased in frequency, soon were generalized, and he became unconscious. They occurred every four or five minutes and were so severe that chloroform inhalations had to be given to control them. He was admitted to St. John's Hospital at 9 p. m. While being put to bed he had a severe general convulsion. His pupils dilated, his breathing ceased, and it was necessary to resort to artificial respiration. A lumbar puncture was performed immediately. The spinal fluid was under tremendous pressure, squirting out a distance of several feet from the needle. During a period of twenty minutes, 160 c.c. of spinal fluid were withdrawn. This was clear and normal throughout. His general condition improved and he had no more convulsions. The following morning he was conscious and complained of a severe left frontal headache. His pulse was 70. His general condition was fair, the neurological examination negative except for absent knee and Achilles jerks bilaterially. His fundi were normal. Sixty c.c. of clear spinal fluid under increased pressure were withdrawn with some relief of his headache. Lumbar puncture was performed every other day for ten days; the spinal fluid pressure gradually became normal, and the amount withdrawn varied from 60 to 20 c.c.. During the first two weeks his pulse varied between 54 and 80. He had periods of severe left frontal headache of several hours' duration which gradually lessened in intensity and frequency. He complained of some nausea and had two attacks of emesis. He yawned frequently. He had several periods during which he appeared sluggish mentally. He had no further convulsions and presented no localizing neurological symptoms. His knee and Achilles jerks gradually returned to normal. His convalescence was uneventful and he was discharged from the hospital August 7. He was re-examined by Dr. Kamman on August 29; all findings were normal, and he felt perfectly well and has remained so.

This case presents many interesting problems. However, with the history of a slight head trauma, the Jacksonian convulsion thirty-one hours later, the evidence of acute intracranial pressure, the marked spinal fluid increase with the removal of 160 c.c. during the first lumbar puncture, all point to an intracranial hemorrhage, extracortical and probably subdural. Because of his moribund condition and in the absence of

localizing signs, a decompression operation when first seen did not seem justifiable.

SUMMARY

Delayed traumatic intracranial hemorrhage occurs more frequently than is ordinarily recognized. The time interval in the subdural hemotomas is usually longer than in the extradural type.

With a history of even a slight head injury with subsequent cerebral manifestations this condition must be seriously considered.

The clinical course is fairly typical; decompression should be performed as soon as the diagnosis is suspected and localizing symptoms have manifested themselves.

Repeated lumbar punctures are a definite therapeutic aid and will frequently tide over an emergency, giving opportunity for further study.

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BIBLIOGRAPHY

1. Brandess, T.: Ztchft. f. ges. Gericht. Med., 2:609, 1923.
2. Griswold and Jelsma: Arch. Surg., p. 45, July, 1927.
3. Kowalewski, P. M.: Arch f. klin. Chir., 141:681, September 16, 1926.
4. Lewandowsky: Handbuch der Neurologie, Band II, p. 1078.
5. Putnam and Cushing: Arch. Surg. p. 329, September, 1925.
6. Smidt, Jena: Arch. f. klin. Chir., 142:475, 1926.
7. Trotter, W.: Brit. Jour. Surg., 2:271, 1914.
8. Winkelbauer, A.: Deut. Ztshft. f. Chir. 196:1, 1926.

COD LIVER OIL

The discovery of at least two specifically potent food factors, vitamins A and D, in cod liver oil within comparatively recent years has completely altered the attitude of scientific investigators, and laymen, as well, toward this product that long had a place in dietotherapy on the basis of essentially empirically founded impressions. It is true that cod liver oil functions as a readily digested and utilized fat and thus as a source of energy; yet an ounce yields little more than 250 calories. So far as present knowledge is concerned, the vitamin content of cod liver oil constitutes its chief claim for consideration in treatment. (Jour. A. M. A., December 29, 1928, p. 2080.)

PASCARNATA-MERRELL

According to the catalogue of the Wm. S. Merrell Co., Pascarnata is prepared from fresh *Passiflora incarnata* (passion flower) and represents the medicinal virtues of the whole plant, but no statement of the amount of passion flower contained in a given quantity of this proprietary is given. Pascarnata has not been accepted for New and Non-official Remedies nor is any passion flower preparation included in the book. The following are some of the claims advanced for Pascarnata: "It serves as an ideal sporific [soporific?], without narcotic action, and is one of the most desirable antispasmodics and antineuralgics available." "In nervous or sick headache, sleeplessness of typhoid and other fevers, cerebral excitement, overworked mental faculties, brain-fag and the overstimulation due to worry and hysteria, Pascarnata will be found highly effective." "It is useful as a palliative in spasmodic bronchial asthma and whooping cough, and also in the hysteria due to dysmenorrhea." The following is the estimate of passion flower that is contained in the Epitome of the U. S. Pharmacopeia and National Formulary issued by the Council on Pharmacy and Chemistry: "Exploited by manufacturers of proprietary medicines for the treatment of insomnia, but probably inert." At one time passion flower was a constituent of many so-called female remedies and uterine tonics, but the drug was found to be without effect on the excised guinea-pig uterus. (Jour. A. M. A., December 15, 1928, p. 1914.)

PFUNDER'S STOMACH TABLETS

Frederick H. Pfunder, Ph.G., of Minneapolis, sells a "patent medicine" that he calls "Pfunder's Stomach Tablets, A Remedy for Ulcers of the Stomach." The A. M. A. Chemical Laboratory analyzed the preparation. It reports that from the result of its analysis it may be calculated that Pfunder's Stomach Tablets contain as essential ingredients: bismuth subnitrate, U. S. P., 30.5 per cent; magnesium oxide, U. S. P., 22.8 per cent; sodium bicarbonate, U. S. P., 24.4 per cent. (Jour. A. M. A., December 1, 1928, p. 1736.)

CHRONIC NON-TUBERCULOUS PULMONARY DISEASE IN CHILDHOOD*

Chester A. Stewart, M.D., and E. S. Platou, M.D.
Minneapolis

DURING childhood, the respiratory tract is the seat of many and repeated infections which often attain proportions of major seriousness. These infections include particularly bronchitis, pneumonia, influenza, measles, and pertussis. Happily, in the majority of these cases, recovery is so complete that residual damage to the lungs cannot be demonstrated. However, we find an appreciable number of children in whom chronic pulmonary disease persists, affecting particularly the basal portion of the lungs, post-dating some acute pulmonary condition which proved to be unusually severe or unduly delayed in its resolution.

The subsequent health career of these children is checkered indeed, especially during the winter months. Being peculiarly vulnerable to infections, they experience frequent colds and repeated attacks of bronchitis which are often unduly protracted. These acute infections, superimposed on a chronic disease, subject many of these children to recurrent attacks of bronchopneumonia, frequently localized in the area in which their lungs are chronically affected.

On examining children having chronic non-tuberculous pulmonary disease, one finds them to be slightly below the average expected weight and height for their age. It is often surprising, however, to find how little these measurements may be affected in the presence of rather extensive pulmonary pathology. There is usually a moderate secondary anemia present, associated with a leukocytosis of about 10 to 12,000. Almost without exception, the contour of the chest presents no peculiarities which may be attributed to the disease present within the lungs. The vital capacity of readings for these patients show considerable daily variability, and in general are below the expected normal. Attacks of coughing occurring during the voluntary expiratory effort necessary in determining the vital capacity of the lungs, interferes to such an extent as to make it impossible for the child to completely empty the lungs in the normal manner. Freeing the bronchi of accumulated secretion by means of postural cough in the inverted position enables the child to exert a more complete and less interrupted effort, in determining the vital capacity. When this procedure is followed, one finds that although the vital capacity is reduced by the presence of chronic non-tuberculous pulmonary diseases, the reduction is not so great as might be expected. With exacerbations of the clinical symptoms, the vital capacity decreases, and increases again when these symptoms subside.

A few of these children present clubbing of the tips of the fingers and toes. In others, a slight thickening of the soft tissues surrounding the nails, together with increased dorsal convexity of the nails, is observed. A productive cough of marked chronicity certainly stands out as one of the common and outstanding features of the disease. The sputum varies greatly in amount in different patients, and in the same patient at various times. In general, it is rather thick and tenacious, of mucoid or mucopurulent consistency, and usually is odorless. The patients often experience difficulty in raising the thick tenacious bronchial accumulations, which results in coughing attacks of some duration which may be paroxysmal in character.

On physical examination of the lungs, the most constant finding is the persistent presence of râles at the basal portion of the lungs. These râles may be heard month after month, and do not disappear even during the intervals when the patient is temporarily improved and relatively free from symptoms. They may be heard particularly toward the end of deep inspiration and also during expiration, especially when expiration is vigorously performed. The râles usually are rather coarse, of the medium moist type, and of rather long duration. They give one the impression that, as the lungs gradually expand, a point is reached where the inspired air finally slips by or through the tenacious material within a bronchus, giving rise to rather coarse and prolonged

*From the Lymanhurst Hospital for Tuberculous Children and Department of Pediatrics, University of Minnesota, Minneapolis. Presented before the Southern Minnesota Medical Association, Rochester, Minnesota, October 2–3, 1928.

râles. If these children are repeatedly examined, the abnormal sounds described above are practically always present. In young patients the presence of basal pulmonary abnormality may escape detection due to the inability or lack of cooperation on the part of the child to take a breath sufficiently deep to enable one to detect the presence of râles.

Aside from the chronic presence of râles, other modifications of auscultatory phenomena of less significance may be noted. These signs include either suppression or exaggeration and roughening of breath sounds over the area involved. One may find that the suppression of breath sounds tends to disappear when the bronchi are freed of accumulated secretion and are replaced either by normal or an exaggerated respiratory sound. In our experience, evidence of cavity formation present where bronchiectasis exists is seldom detected before or after postural cough even though the cavitation be considerable in extent. Resonance may be impaired over the diseased area, and fremitus may be increased to some extent. In general the physical findings in different patients vary somewhat, but in the group taken as a whole the one outstanding feature common to all is the constant presence of the fairly characteristic râles persisting for months in the basal portions of the lungs.

X-ray pictures in these cases usually reveal pathological changes particularly involving the bronchi and immediately adjacent tissues in the involved area. In some patients, the changes noted by *x*-ray reveal more change than was suspected on physical examination, whereas in other children just the reverse is found.

A diagnosis of a chronic basal lesion, however, should not be based upon a single *x*-ray plate, but rather upon repeated physical examinations and repeated plates which demonstrate that chronicity and persistence of the disease in the area involved. In making this diagnosis, we believe the physical examination to be of more importance than that made by means of the roentgen ray. However, in the determination of the presence or extent of bronchiectasis, the *x*-ray demonstration of the configuration of the bronchial tree by means of the introduction of iodized oil is indispensable.

To exclude the possibility of the chronic lesion being tuberculous in origin, one may employ tuberculin tests and sputum examinations. When these prove to be negative together with clinical observation that the course of the disease does not resemble that expected of a tuberculous lesion, one can usually determine without great difficulty that the patient is suffering from a chronic non-tuberculous process. In addition, the presence of foreign bodies and lung abscess must be considered and proper measures should be employed to exclude these possibilities. It is conceivable that situations may be encountered which render a diagnosis difficult. We believe, however, that in the individual case as clinical opinion gradually matures from repeated examinations, a correct diagnosis of chronic non-tuberculous pulmonary disease usually may be made with considerable accuracy and without great difficulty.

Following the opening of the Lymanhurst School for tuberculous children, a considerable number of cases were admitted on account of chronic cough and general poor health with a suspicion of tuberculosis. This group now totals 28, all of whom have had repeated tuberculin, sputum, *x*-ray and physical examinations, which, together with observation over a period ranging from three to thirty-one months, has convinced us that their pulmonary disease is non-tuberculous in type.

Of this group, the roentgenologists reported the presence of definite cavitation in two instances. In two other patients the introduction of lipiodol into the bronchi disclosed the presence of bronchiectasis which was not demonstrable on the ordinary plates. The administration of lipiodol in four other cases in this group revealed the bronchi to be of normal caliber and contour. This demonstrated, therefore, that the group as a whole includes individuals having bronchiectatic dilatations and also patients in which the bronchi are apparently normal in size and shape. Although these anatomical differences exist so far as the various cases are concerned, nevertheless, a very striking similarity is found in the individual patients constituting the group with regard to their clinical history and physical findings. The similarity in these respects is so uniform as to convince us that in children having a chronic non-tuberculous pulmonary disease, resort usually must be made to the use of lipiodal for the conclusive demonstration of the presence or the absence of bronchiectatic dilatation of the bronchi. The features of similarity include mod-

erate undernutrition, peculiar vulnerability to attacks of acute respiratory disease of varying severity, chronic cough, the almost universal presence of paranasal sinus disease, and above all, the chronic presence of characteristic coarse, medium, moist prolonged râles in the basal portion of the lungs persisting month after month even during the intervals when the patient is enjoying comparatively good health.

From the study of this group of which a few have a definite beginning brochiectasis, the impression is gained that should the chronic lesion present in the remaining patients persist for an undue length of time, many of these may also eventually acquire a bronchiectasis. When once established, bronchiectasis proves to be a chronic progressive essentially incurable condition which may in unilateral cases necessitate eventually such radical procedures as extrapleural thoracoplasty and lobectomy to afford relief. Should the condition prove to be bilateral, relief by such measures necessarily is either greatly limited or impossible. Greater possibilities of relief possibly may be offered by the early recognition of chronic non-tuberculous basal disease together with an appreciation that bronchiectasis may develop if the condition persists, through prompting one to institute all possible measures in an attempt to remedy the condition. Our attempts in this respect with the twenty-eight Lymanhurst children have met with encouragement in some instances and disappointment in others. The more successful results were obtained in the instances where the home coöperation was excellent, and proved least beneficial where the parents ignore instruction and are careless concerning the care of their children. In some instances, however, the beneficial results have been practically nil in spite of the best of home care. This was especially true of the cases having a definite bronchiectasis.

The plan of therapy instituted in the group studied included the administration of iodides usually in the form of Forscheimer's solution, and also of cod liver oil, iron and creosote. A few of the children were given intravenous neosalvarsan injections. At school, all of the patients were required to hang daily, suspended by their knees from a horizontal bar, in order to free the bronchi of accumulated secretion by coughing in the inverted position. This procedure was repeated morning and night in the home. A solution of ephedrin sulphate was administered shortly before postural coughing was performed with the hope that this expedient would enhance the effectiveness of the postural drainage. The diseased maxillary sinuses were opened and drained surgically and subsequently treated by local intranasal instillations of a one per cent ephedrin solution. Other foci of infection were removed insofar as it was possible to do so. Heliotherapy also was employed throughout the school year. In addition, the parents were instructed to feed their children a balanced diet and to see that they were warmly clothed during the cold months of the year.

As a result of this regime, encouraging and disappointing results have been obtained. The results were considered as disappointing when definite clinical improvement did not occur, but even these patients apparently derived definite benefit from the therapeutic measures instituted, judging from the observation that in not a single case has the lung process increased to any appreciable extent during the period of observation.

In four cases who have been under treatment two years or longer, decidedly beneficial results have been observed, which may be illustrated by the record of one of our patients who developed a chronic non-tuberculous pulmonary condition following a severe attack of measles at the age of five years. During the following seventeen months, she was examined repeatedly and was never found free from evidence of pulmonary abnormality. During this period, the therapy outlined previously in this paper was insituted. The maxillary sinuses were treated surgically and drained profusely. As the months went by, this child improved in nutrition and in general health. It was not until February, 1928, however, that the lungs were first found to be entirely normal on physical examination and they have remained so to the present time, in spite of two attacks of acute upper respiratory infection which occurred during this interval. Similar results were obtained in the three other children previously mentioned. Eight of the children studied were improved to the extent that the râles which previously had been constantly present for months have been seen to disappear for periods varying from several weeks to a few months, but tend to reappear following attacks of acute respiratory disease. When the râles reappear, they prove to be very stubborn in their persistence but usually

disappear again following a few weeks of freedom from acute respiratory infection. Little or no improvement has been obtained in eleven of the twenty-eight cases. In these instances râles have been constantly present throughout the period of observation of the patient. On the basis of persistent physical findings, we have classified these children as unimproved, although in several instances the parents were of the opinion that the health of the child was better than it formerly had been. The remaining cases in this group have not been under observation a sufficient length of time to warrant any conclusions.

As a result of this study, we have been impressed by certain observations and experiences. We are convinced that chronic pulmonary disease affecting particularly the basal portion of the lungs occurs during childhood with frequency. The determination of the non-tuberculous etiology of the condition usually may be made with accuracy and without great difficulty. A diagnosis of chronic non-tuberculous disease becomes comparatively simple provided one repeatedly examines the patient over a period of a few weeks and thus discovers the chronicity of the pathological condition present. An accurate opinion as to the presence or absence of definite bronchiectasis usually requires the employment of lipiodol. When lipiodol is used, a certain per cent of the children suffering from chronic non-tuberculous disease are found to have definite bronchiectasis. On the basis of physical findings, the patients having bronchiectasis of slight or moderate degree are often indistinguishable from those in whom no bronchiectasis can be demonstrated. This observation suggests, therefore, that chronic non-tuberculous pulmonary disease, particularly of the basal portion of the lungs, may frequently be a precursor to the later development of a definite bronchiectasis. When bronchiectasis becomes established, it usually proves to be a chronically progressive disease not infrequently advancing to a stage requiring very radical therapeutic measures. However, if we are able to recognize chronic non tuberculous pulmonary disease comparatively early in childhood either before bronchiectasis has developed or before it has progressed beyond its earliest stage, considerable benefit may be derived through a relatively simple but persistent regime of treatment. We must admit, nevertheless, that chronic non-tuberculous disease occurring in children is very resistant to treatment and presents a situation of such serious future potentialities as to urge one to stubbornly persist in the employment of every known procedure offering promise of eventual recovery of certain patients and of distinct clinical improvement of others.

DISCUSSION

Dr. E. K. Geer (St. Paul): To me, this is an important presentation because it has as its dominant theme the prevention of bronchiectasis. It surely must be granted that advanced bilateral bronchiectasis is one of the most discouraging of the many difficult problems confronting those seeing many chest cases. Anything which tends to prevent bronchiectasis is royally welcome.

The text-books' description of bronchiectasis is that of an advanced condition. But it is possible to diagnose it in an early stage. The more general use of bronchoscopy and intratracheal injection of iodized oil has made this very clear. And early bronchietasis can be treated successfully.

Of course, it is impossible to predict how many of the cases such as Dr. Stewart mentioned will develop a true ectasis of the bronchi. But we do know that most of them exhibit the most important single intrinsic cause of bronchiectasis, namely, chronic or recurring infection of the bronchial walls. And in treating such individuals it is well, indeed, to look into the possible future and handle the present situation accordingly.

A word regarding the *x*-ray of children's chests. It is well to point out that children exhibit a much higher percentage of basal tuberculous lesions than adults, so that much care and resorting to every possible diagnostic means are imperative, rather than to assume, as so many do, that because a lesion is basal it must be non-tuberculous.

CASE REPORTS

PARALYSIS OF THE SERRATUS ANTERIOR MUSCLE BY TRAUMA OF THE LONG THORACIC NERVE

LOUIS DUNN, M.D.*
Minneapolis

Paralysis of the serratus anterior without involvement of other muscles in the shoulder or arm is a rare condition, and usually results from trauma applied above the clavicle. Description of the condition and resultant deformity is illustrated by a case which recently came under my care.

The patient was a man, aged 52, small of stature and slight of build. On March 15th, he slipped on an icy sidewalk and fell on his right side. He was unable to catch himself, so that his right shoulder sustained the entire weight of the fall. Severe pain resulted, which passed away in about fifteen minutes, and was followed by a dull ache lasting for several days. He first noted that it was difficult to use his right arm in dressing himself on the second day after his injury. He did not realize that any deformity of the shoulder existed until he came to my office sixteen days after his accident. Upon examination, there was nothing abnormal to be seen anteriorly. Posteriorly, with the arms by the side, a slight projection of the median border of the right scapula was present. By abduction of both arms in the horizontal position, the right scapula took a position to the side of the chest, its median border projecting directly backward and its inferior angle rotating backwards and upwards (Fig. 1). By pushing forward the interior angle of the scapula, with the patient's arm held forward and horizontal, the forearm was made to rotate eight inches upward. He was unable to do this voluntarily. An endeavor on his part to raise both arms above the head resulted in lifting the left arm to a perpendicular position and the right arm to a not quite horizontal position. No pain was experienced on motion, and no tenderness was present on palpation except along a narrow area for about three inches on the right side of the neck above the clavicle. Neither motion nor sensation of the right arm or forearm was impaired.

This syndrome is distinctive of serratus anterior paralysis. A corresponding picture and description of congenital paralysis of the serratus anterior muscle is shown in "Handbuch der Neurologie" by M. Lewandowsky, Vol. 2, Spezielle Neurologie I, p. 257, 1911. He gives references to a number of corresponding traumatic paralyses, p. 281-4.

The long thoracic nerve which innervates the serratus anterior, rises by three roots from the fifth, sixth and seventh cervical nerve. Quoting from Morris's Human Anatomy: "The upper two roots traverse the substance of the scalenus medius; the root from the seventh passes in front of that muscle. Twigs are furnished to the superior portion of the serratus anterior by the upper two roots; lower down they unite and are subsequently joined by the root from the seventh when present. The trunk of the nerve passes downward behind the brachial plexus and the first stage of the axillary artery, and runs along the axillary surface of the serratus anterior (magnus), supplying twigs to each of the digitations of that muscle."

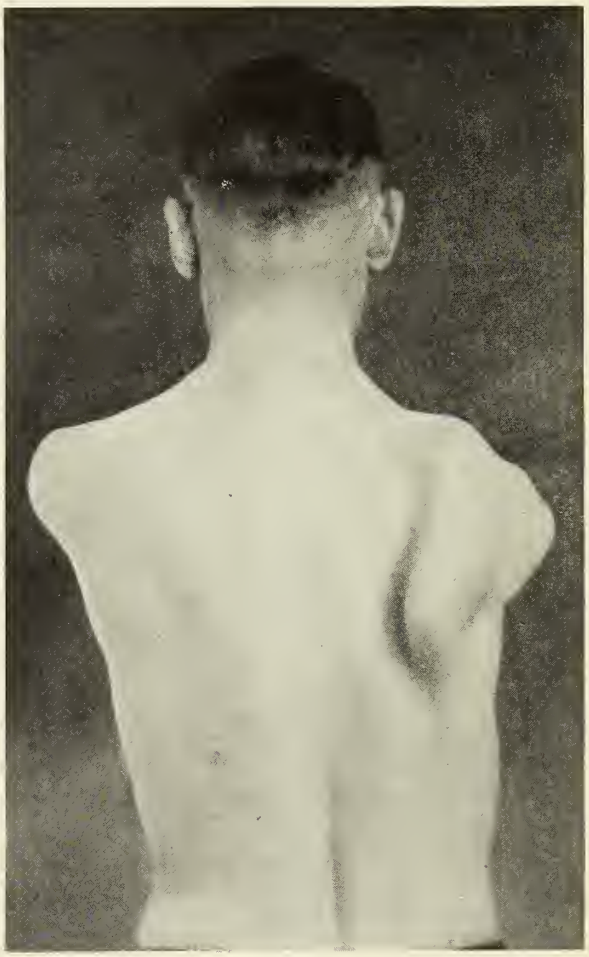

Fig. 1

Two or three inches of the long thoracic nerve above the clavicle is exposed to injury. There are two ways in which such an injury can occur: First, by catching the nerve between the clavicle and the first rib, and

*The author, Louis Dunn, died April 20, 1928. This article was his last scientific effort.

second by pinching it between the clavicle and the transverse processes of the cervical vertebræ. In all probability, such an injury does not occur unless the cervical fat is scanty and unless there exists a configuration which brings the clavicle into close juxtaposition with the first rib of the transverse processes of the fifth and sixth cervical vertebræ. With such an arrangement existing, it is possible for a fall on the shoulder to force the clavicle backwards and upwards with consequent injury to the long thoracic nerve.

UNILATERAL CONGENITAL ABSENCE OF TUBE AND OVARY

REPORT OF CASE

H. R. Leland, M.D.
Minneapolis

Mrs. C. T., aged 24, housewife, was admitted to the hospital complaining of paroxysmal attacks of pain in the upper and lower right quadrants with vomiting of two days duration. She stated that the pain in the abdomen came on suddenly two days previously and that it was of a sharp stinging nature, coming on in paroxysms in the upper and lower quadrants of the abdomen. She had been well previous to the attack. During the preceding twenty-four hours she had vomited several times. The bowels had been regular with no disturbances.

Past History.—Married two years. She had had one induced abortion one year ago. Menses regular of the twenty-eight day type, four days duration. No pain. The last period occurred one week ago.

Examination.—The abdomen showed a marked tenderness in the upper and lower right quadrants and a marked muscle rigidity.

Bimanual examination showed a marked tenderness in the right adnexal region. The cervix was normal and the uterus of normal size, shape and position. There was a mass about the size of a hen's egg in the right adnexa which was extremely tender to touch and which was taken to be a tubo-ovarian swelling. No trouble was made out on the left.

Laboratory Data.—Urine negative, red count, 4,000,000; white count (on admission) 20,400. With expectant treatment this dropped to 5,300 when she was operated.

Operation.—Usual mid-line incision. There was a cyst of the right ovary the size of a hen's egg. There were evidences of chronic infection of the right tube and of the appendix. In the lower right pelvis there was an organized exudate but no free pus. The pelvic peritoneum and the cecum were intensely congested.

There was complete absence of the left tube, ovary and the left broad ligament. There were no other congenital malformations found in the pelvis. A badly diseased gall bladder with adhesions to the duodenum was also found.

The literature on unilateral absence of the tube and ovary is very meager. The ovary is rarely absent but may lie displaced in the upper pelvis, iliac fossa, the groin, labia, or even in the retroperitoneal region and must be carefully sought for. Nagel states that ovarian aplasia occurs only in monsters, mostly nonviable, but in 1923 Eismayer collected ten cases of unilateral absence and one bilateral. As a rule, there is homolateral absence of the tube and in one-half of the group there was absence of the corresponding kidney.

PERSISTENCE OF THE CLOACA

REPORT OF CASE

S. G. Major, M.D.
Saint Paul

Persistence of the cloaca is a rather rare anomaly, and since the case herewith presented differs in many respects from the usual type of this defect, it seems worthy of a case report. A large number of cases of persistent cloaca have been published, but after a careful search of the literature no similar case has come to my attention.

Before giving the case report it may be well to briefly summarize the embryology involved. The cloaca represents the caudal expansion of the hind-gut, which gives off the stalk of the allantois ventrocephalad. At a later stage of development the cloaca receives the mesonephric (Wolffian) ducts laterally. Thus, we see that the cloaca ultimately receives both the hind-gut and the mesonephric ducts, as well as communicating with the stalk of the allantois. This process has been completed in the 5 mm. embryo.

At a still later stage the third primitive kidney develops, the metanephros. The glomerulus and proximal convoluted tubule are derivatives of the posterior nephrotomes, while the remainder of the uriniferous tubule, the renal pelvis and the ureter are early represented by a bud given off by the mesonephric ducts just before they enter the wall of the cloaca. The bud grows dorso-cephalad so that it unites with the posterior nephrotome derivatives. If this union fails to occur we get cystic formation, and if any great number of such units are involved we get the condition known as polycystic kidney, which is usually a bilateral anomaly.

Still another change takes place in the duct of the metanephros (ureter). This consists in the shifting of the opening of the duct from the mesonephric duct to the wall of the vesico-urethral anlage. Thus the metanephric duct becomes the ureter of the fully developed fetus, while the duct of the mesonephros is destined to become the genital duct of the male.

Let us now consider the fate of the cloaca in the course of normal development. It is divided into a dorsal rectum and a central urogenital sinus by a transverse saddle-like partition, the partition extending caudally. In the 11 mm. embryo the primitive urogenital sinus has, by a process of elongation and constriction, become divided into two portions, the dorsal vesico-urethral anlage, and the phallic portion. The former division receives the duct of the allantois, and the mesonephric ducts, as well as the metanephric ducts, after they have shifted their position, as already de-

scribed. The phallic division of the sinus extends into the phallus of both sexes and forms part of the urethra in the male, while it forms practically the entire urethra of the female.

Still another point remains to be considered, and that is the formation of the anal canal. This is of ectodermal origin and forms as an invagination of the ectoderm. The anal membrane serves as a partition between the ectodermal and entodermal portions. The membrane later becomes perforate.

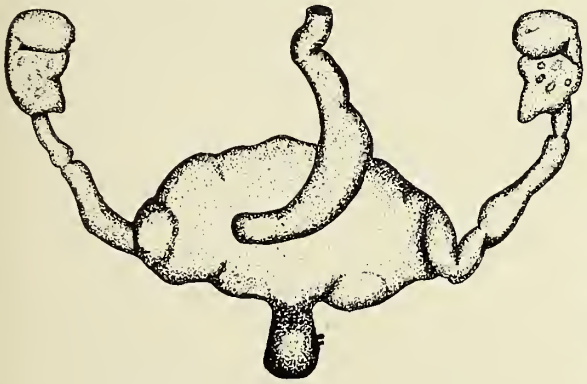

Fig. 1

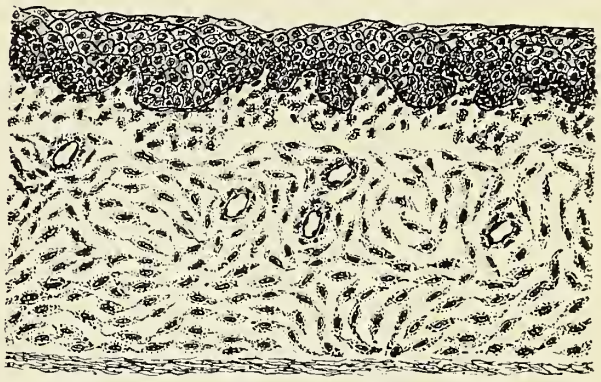

Fig. 2

The present case is that of a new-born male infant, which was the second of twins. Labor and delivery were normal. The body measured 42 cm. in length and weighed 1,830 grams. It was poorly developed and presented the following external anomalies: absence of anus; bilateral talipes equino-varus; spinal bifida in the sacral region; absence of the urethra. The external genitalia were normal except as mentioned. The infant died one hour after birth.

At autopsy several additional anomalies were found. The heart, lungs and thymus were normal. In the lower abdominal quadrants was a mass which was found to be the cloaca. It measured 14 cm. in its longest diameter, and displaced the cecum upward so that the appendix was found in the left upper quadrant, slightly to the left of the mid-line. The cloaca apparently communicated with the rectum and both ureters. Together with the kidneys, ureters and intestine it was removed en masse (Fig. 1).

The kidneys were found to be poorly developed and were polycystic. The ureters were dilated and were found to contain a clear straw-colored fluid. The wall of the cloaca was punctured and 50 c.c. of a turbid yellow fluid were removed which had a specific gravity of 1.014. On examining the interior of the organ it was found to communicate through a large aperture with a diverticulum-like structure which measures 1.6 cm. in diameter. On the right lateral wall of the latter structure were found two small tubular openings. It was thought that the tubes represented the remains of the Mullerian ducts, while the prostatic utricle was contained in the diverticulum wall.

On the internal aspect of the cloaca a slit-like opening was found opposite the right ureter, while no similar opening was found on the left. However, fluid could not be forced through the opening from above, nor could a probe be inserted. Similarly, fluid could not be forced through the opposite ureter. At the lower end of the left ureter was a dilatation, but there was a distinct septum between this and the cavity of the cloaca. The rectum was connected with the cloaca only by a dense mass of fibrous tissue, there being no evidence of any communication. The stalk of the allantois was present on the ventro-cephalad aspect of the cloaca.

A section was taken of the cloaca for histological study and its wall was found to be composed of four rather indistinct layers. The mucosa was composed of stratified epithelium, which varied from six to eight cells in thickness. The cells of the basal layer were somewhat smaller than those placed more superficially. The nuclei were relatively large and the cytoplasm was finely granular. In Figure 2 it will be seen that the more superficial cells tend to be elongated, while basal cells are columnar in type.

The submucosa was composed of a loose connective tissue. The cells of the muscularis were arranged in a very chaotic fashion and there was no evidence of arrangement into layers. The outer layer was composed of a rather dense connective tissue. Thus, the histology corresponded in a rough way to that of the embryonic cloaca.

President's Letter

SAFEGUARDING THE MILK SUPPLY

LAST week Dr. Paul B. Brooks, Deputy State Health Commissioner of New York State, in a talk over the radio, made the statement that:

> "New York would have almost no typhoid fever, still lower infant mortality and fewer cases of bone and gland tuberculosis among children if every community in addition to properly safeguarding its water supply, required the pasteurization of all milk sold."

A very large percentage of the milk sold in the larger cities of Minnesota is pasteurized and in many of the smaller towns there are in operation excellent pasteurizing plants under the supervision of able and competent men. There are, however, many places where milk is sold that does not have even ordinary care in its production. It may not be possible in some of the rural districts to produce pasteurized milk, but that is not a good or sufficient reason for a non-supply of good clean, healthful milk. Anyone of ordinary intelligence may, if he will, produce clean milk. The fact that every now and then there occur local epidemics of septic sore throat, diphtheria, etc., which is attributable to an infected milk supply, should lead everyone to demand that so universally used a product be at least clean and free from the germs of disease. Whenever there is any possible question of doubt the safest plan is to boil the milk, especially if it be used for infants and children. It is frequently said that pasteurization or boiling the milk changes its character and that children refuse to take it. As a matter of fact the change is probably not great. The loss of vitamin C, which is a preventive of scurvy, is adequately replaced by fruit juices and vegetables. The change in taste matters not at all to the infant, who on occasion takes soured milk just as readily as sweet. Boiled milk, too, is more easily digested. The loss of fat content in boiled milk is more apparent than real, for the reason that boiling breaks up the fat globules, which then do not so readily rise to the top.

Most of us would probably prefer good, pure, clean raw milk and if it were possible to eliminate the human equation in its production all might be well. Nor will even pasteurization suffice if the milk does not reach a definite standard of cleanliness before it is so treated. There are many dairies in Minnesota that can and do produce good, clean, wholesome raw milk, notably those dairies supplying "Certified Milk" as well as some others. We have, however, not reached that point of efficiency where it is possible to eliminate accidents. *Therefore, Pasteurize.*

EDITORIAL

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Vol. XII February, 1929 No. 2

THE INFLUENZA EPIDEMIC

The epidemic of influenza from which the country is recovering, while apparently not as severe as the one which reached its peak in 1918, has been exacting an appreciable toll in human lives from the complication of bronchopneumonia. The Census Bureau estimates that some 26,000 deaths from pneumonia occurred in the country during the seven weeks preceding January 5, the peak of the epidemic probably having been reached by that date. A peculiarity of the present epidemic is that it started in the west and spread eastward. In 1918 the Census Bureau reported 245,846 deaths and in the following year 84,113 from influenza and pneumonia.

Elderly individuals with poor general resistance seemed to fare the worst and the lesser complications of middle ear abscesses, mastoiditis and acute nasal sinus involvement occurred with marked frequency.

Unfortunately the cause of influenza has not as yet been determined. The influenza bacillus while frequently associated with the diseases has not been conclusively determined to be the culprit. From the nature of the extreme contagiousness of the disease a microörganism must be to blame, but until the bacteriology of the disease has been determined little is likely to be accomplished either in the prevention or control of this scourge.

Most health officers have rather thrown up their hands when methods of control of the epidemic have been mentioned. It is not likely that any of the usual isolation methods would be of service in lessening the spread of the malady. Apparently an epidemic of influenza rages until all those susceptible contract the disease and become temporarily immune. Immunity to the infection we know is not lasting and judging from past experience we can expect an increased incidence of the disease in the months to come. Neither will it be surprising if the usual post-influenzal increase in encephalitis also occurs.

The secrets of the epidemiology of influenza remain to be wrested from nature before this scourge, mild compared to some of the plagues which have afflicted the human race, is added to the list of pests overcome by modern scientific medicine, such as the bubonic plague, cholera, yellow fever, smallpox and typhoid fever.

DISCONTINUANCE OF THE VENEREAL DEPARTMENT OF THE STATE BOARD OF HEALTH

Shortly after America entered the World War the State Safety Commission instituted a program for the prevention of venereal diseases for the most part devoted to the protection of the

soldiers. In January, 1918, the work was taken over by the State Board of Health and carried on by the specially created Division of Venereal Diseases of the State Department of Health, which since that time has been supported by an appropriation for this special purpose. Originally the sum of $30,000 was appropriated by the legislature which was devoted to various activities of the division, which included the maintenance of a laboratory. An additional $5,000 was appropriated for educational activities directed against venereal diseases. From time to time the work of the division was extended as certain federal funds became available, until two years ago, when, the amount approved by the general state budget for the State Board of Health being considerably less than enough to provide the $35,000 for the Venereal Division, the work of this division was reduced to little more than the maintenance of a laboratory without a paid director.

This year the State Board of Health requested the reappropriation of the $35,000 for the maintenance of the various laboratory and educational activities of the Division. The Department of Health is an official branch of the State government. Its expenditures are controlled by the Commission of Administration and Finance created in 1925. The Board submits its request for appropriation to the Budget Commission, by whose decision the Board quite properly must abide in its contact with the legislature. Although the Commissioner of the Budget has recommended an appropriation for the State Board of Health some $6,000 greater than the previous appropriation, no recommendation has been made for any money for the Division of Venereal Diseases. This means that even the present activities of the Division, which include for the most part the free laboratory service rendered the physicians and public throughout the state, will be discontinued June 30, 1929.

In 1928 the laboratory service consisted of the following: 43,672 Wassermann tests; 9,585 slides examined for gonorrhea; 1,045 spinal fluids. The Social Service handled 945 cases, 386 having been referred by physicians, 398 by hospitals and dispensaries, 106 by social and penal institutions and 55 by other sources. There were reported to the Division 4,442 cases of syphilis, 4,858 cases of gonorrhea and 38 cases of chancroid.

In the past eighteen months practically no venereal disease education activities have been carried out. Nine lectures attended by medical students, nurses and social workers, and distribution of 7,253 pamphlets covered that phase of the activity.

If the Division of Venereal Diseases is discontinued the cases of venereal disease picked up by the practitioners of the state through the rather liberal use of the free service which has been rendered by the laboratory since 1917 and which would not be diagnosed if the usual laboratory fees had to be paid by the patients, will be overlooked. While there has been some question as to the value of reporting venereal diseases, the work of the follow-up branch of the division in urging the diseased to continue treatment has proved the value of the procedure. In the three large cities venereal clinics for free treatment and a limited amount of follow-up work has been taken over by the local charities or health departments. The remainder of the state will suffer most from the discontinuance of the Venereal Division.

We realize there is some room for argument as to how far the state should go in the treatment of disease in general. Most agree that it should go far in the prevention of disease, and that the detection of infection is necessary in the prevention of an infectious disease has been the reason for the past activities of the Division. The need for certain work along venereal disease prevention is evident. The discontinuance of the Venereal Division of the State Board of Health will mean that a certain increase in the prevalence of venereal disease will result unless some other solution of the problem is offered.

THE NEED FOR PREVENTORIUMS

The preventorium is an institution wherein infants and children who have lived with tuberculous persons, and therefore are almost certain to be infected, can be cared for and the development of the disease can be thwarted. The definition just given seems to be necessary, for this country never has had many preventoriums and interest in them has flagged. Knopf has stressed the importance of these institutions. He believes that if tuberculosis really is to be conquered in the United States the almost total lack

of preventoriums is one of the essentials to which attention must be given. The same author points with regret to the fact that the first typical infantorium that served the states of New York and New Jersey, and which was made possible by the efforts of Dr. Alfred F. Hess, had to close because of lack of funds. Conceivably, if money is to be given or appropriated for the establishment and maintenance of preventoriums donors and officials would like evidence that the establishments are worth their keep. There is plenty of that but it is not always easy to find. Bronfin's recent article, therefore, is timely. He reviewed the clinical records of 300 children in the Hofheimer Preventorium, with the following results: Seventy per cent of the children were 7 per cent or more underweight; 45 per cent had definite cervical or submaxillary lymphadenitis; roentgenograms of the chest were normal in only seventy-two of the 300; 30 per cent had fever; in 22 per cent there was calcification at the hilum; in 11.6 per cent primary foci were detected, and in 11.3 per cent frank parenchymal pulmonary infiltration was noted. The physician does not have to be told what these signs mean; that some of these children, if untreated, would have succumbed in a few months; that others would have resisted the infection temporarily, only to die from a subsequent flare-up. In Bronfin's series "under treatment, symptomatic improvement invariably occurred." Treatment consisted in curtailment of school work and of exercise, graded heliotherapy, and attention to nourishment, rest and sleep. There was little routine; much individualization. The results would indicate that preventoriums are essential and, when adequately staffed and when patients are properly selected, are a national asset.

Richard M. Hewitt, M.D.

BIBLIOGRAPHY

1. Knopf, S. A.: Tuberculosis Among Young Women: Present Relative Increase in the Morbidity and Mortality. Jour. Am. Med. Assn., 90:532 (Feb. 18), 1928. Knopf, S. A.: Essentials in the Prevention of Tuberculosis in Infancy and Childhood. Jour. Am. Med. Assn., 88:1058 (Apr. 2), 1927.
2. Bronfin, I. D.: The Preventorium Child: A Clinical Review of Three Hundred Cases. Am. Jour. Dis. Child., 36:931 (Nov.), 1928.
3. The Preventorium Child. Editorial: Jour. Am. Med. Assn., 91:1894 (Dec. 15), 1928.

HISTORICAL COMMITTEE

This is the third month we have been running this stuff. Shall we keep it up? We may write ourselves out if you don't help us, but we can keep it up for some months yet. Help just a little by sending in items for our History Committee. Below is the story we promised for this month.

Dr. John Emerson, an army surgeon, arrived at Ft. Snelling bringing with him a negro slave by the name of Dred Scott. You have heard of the Dred Scott Decision; we read it in our old history book at school years ago, but the book said that Dred Scott was taken to Michigan. So he was, but at that time this part of the country was part of Michigan.

We have no portrait of Dr. Emerson nor of Dred Scott, but we suppose either could be had if we searched for them. What was an army surgeon's uniform in those days? Was he allowed to wear an epaulet on both shoulders or only on one? Was he a real officer or only a half soldier? Well, that is wandering from our object. We may run some pictures again next month. Who was the first volunteer surgeon to enlist in the Civil War and who examined the first volunteer recruit for that conflict? Yes, it was a Minnesota man in both instances. Were they one and the same man? We shall tell you next month. Remember, Dr. H. M. Workman, of Tracy, is Secretary of our Committee. He will be glad to hear from you.

J. M. A.

ANATOXIN AND DIPHTHERIA TOXOID

Anatoxin is diphtheria toxin so modified by the addition of formaldehyde and the application of heat that the toxic properties are greatly reduced while the antigenic properties are retained. The product is prepared and recommended for use in diphtheria prophylaxis by Ramon of the Pasteur Institute, Paris, France. American manufacturers supply a product, diphtheria toxoid, which is prepared by the addition of formaldehyde to diphtheria toxin and the application of heat. This material is tested for antigenic efficiency by a guinea-pig protection test. It is essentially the same as anatoxin except for the method of testing for potency. The diphtheria toxoid of the H. K. Mulford Co. and E. R. Squibb & Sons has been accepted for New and Non-official Remedies. (Jour. A. M. A., December 22, 1928, p. 2016.)

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Ethics and Professional Advertising

One of the problems of the medical profession in its relations to the public is the question of ethical publicity, or, as some of the laity prefer to call it, "Professional Advertising." The following editorial from the Chicago Tribune of December 19 will be of interest:

"The suggestion that professional ethics be revised to the extent of permitting doctors setting forth their experience and qualification in formal advertising cards has elicited enough comment to indicate that the subject is interesting. The discussion has been carried on exclusively by practitioners and it has been without exception sympathetic to the proposal. There has been no antagonism expressed and the outlaw fringe of the profession, which practices unscrupulous advertising, has not championed the suggestion as a justification for their tactics. It has been accepted by the moderates among the practitioners as a measure which would afford protection to the public and improve the condition of the competent practitioner.

"One of the most frequent criticisms of the present restriction against advertising is that a number of physicians actually receive the full benefits of advertising through prominent mention in the news columns. Without violating the ethics of the profession they have the faculty of gaining publicity concerning their work or their statements. This, the critics who have expressed themselves consider an injustice, for the equally competent practitioner or specialist lacking this front page flair must be content with obscurity. He cannot overcome his disadvantage by making a dignified statement of his professional preparation, his specialty, his hours of consultation, and his associations through an advertising medium.

"Others have suggested that the advertising prohibition is a superannuated convention, a static influence limiting the practice of physicians without self-promotion ability and denying information to the public. In cities, particularly where there is little neighborhood stability, a doctor is handicapped. He cannot depend upon a reputation to bring him patients because of the shifting population and he is restrained from fixing the attention of the community upon his practice by the insertion of a professional card. The public, too, without the institution of the family doctor, is without medical advice in emergencies. Consequently there is the likelihood of a patient becoming the victim of unscrupulous practitioners or of a cult.

"It is the influence of the American Medical Association, of course, which prevents such a revision of medical ethics. It is responsible, as no other agency could be, for the high medical standards, progress in medical research, distribution of information, and promotion of the public health in this country, but with its power there is the danger of creating too great censorship, of resisting progress with the inertia of tradition. It is well known that a number of its members regard its control of the profession as tyrannous. Some of this criticism should not be entirely discredited, although sympathy for the quacks who have been outlawed by the association and whose practice is constantly being fought should decidedly not be encouraged. In some respects the restraints imposed upon amateurs by the American Lawn Tennis Association are comparable to the censorship of the American Medical Association. In forbidding amateurs to engage in certain publicity activity the tennis association refused to refashion its rules according to changing conditions. The same observation is probably somewhat justified in the case of the American Medical Association."

Committee on State Health Relations

The State Medical Association's Committee on State Health Relations has addressed the following questions to the Secretaries of the various County and District Medical Societies:

1. How does the medical profession of your district get on with the following agencies? Is there a good feeling and close coöperation, or a lack of coöperation, or definite friction (and if so, how)?

   a. State Board of Health in its various activities especially its Child Hygiene Division (under Sheppard-Towner Act.

   b. County Public Health Nurses—the nurse herself and the County Public Health Nurse's Advisory Committee, if there is one.

   c. State Board of Control—Various State Hospitals and Institutions, Children's Bureau.

2. Are these local activities carried out in conjunction with one another or independently? Are these activities distinctly separate from the activities of unofficial organizations such as County Red Cross, Public Health, or Tuberculosis Associations?

3. Do the profession and the people clearly differentiate the activities of the tax-supported from those of the unofficial organizations? If there is confusion, do you think it is due to confusion of aims and activities or to actual confusion of personnel?

4. Has your County or District Medical Society an official contact with the various local health agencies through some committee or appointed delegates, or an informal contact through individual doctors working with those agencies, or is there no contact?

It is hoped that the replies will reach us in time to be studied before the annual meeting of the Secretaries in St. Paul on February 23rd.

Definite views of any member of the State Medical Association regarding the above questions will be welcomed if sent in through the Secretary of his local Medical Society or directly to one of the following:

F. H. Aldrich, M.D.....Belview
E. S. Boleyn, M.D.....Stillwater
Harry Conner, M.D.....St. Paul
Edward E. Evans, M.D.....Minneapolis
E. W. Fahey, M.D.....St. Paul
A. Gullixson, M.D.....Albert Lea
C. L. Haney, M.D.....Duluth
John N. Libert, M.D.....St. Cloud
Olaf A. Olson, M.D.....Minneapolis
Wm. A. Piper, M.D.....Mountain Lake
L. G. Smith, M.D.....Montevideo
J. J. Stratte, M.D.....Hallock
J. A. Thabes, M.D.....Brainerd
Theodore H. Sweetser, M.D.....Minneapolis

HAIR-A-GAIN

This is an alleged enhancer of beauty, sheen, luster, color, texture, contour and abundance of the scalp and hair. Georgia O. George of Los Angeles claims to be the inventor, originator and sole manufacturer of this preparation and of Mask O'Uth Liquid Mask and Scientific Systemethod. "Hair-A-Gain" is advertised in newspapers and by radio broadcasting stations WMCA, New York, WHK, Cleveland, WEBH, Chicago, KMOX, St. Louis, KFXF, Denver, and various stations on the Pacific Coast. The A. M. A. Chemical Laboratory reports that Hair-A-Gain Liquid Shampoo is marketed in bottles containing about 240 c.c. of a yellow, turbid, viscous liquid, possessing a faint odor suggestive of tar and a marked insoluble residue. From its examination the Laboratory concludes that the preparation is essentially a water solution of ordinary soap. Probably it is the tar, or tarlike substance, that is incorporated in the Hair-A-Gain Paste that has been responsible for such unpleasant effects as have been reported from its use. (Jour. A. M. A., December 22, 1928, p. 2012.)

SERIOUS ILLNESS CAUSED BY COPPER CLEANSER CONTAINING CYANIDE

Investigation of the sudden serious illness of a number of persons in a hotel in a city in the central part of New York, revealed that they were suffering from cyanide poisoning.

A sample of a cleanser used to clean copper pots and pans was obtained and referred to the Dairy and Food Bureau of the State Department of Agriculture and Markets. Analysis showed a relatively large amount of cyanide. This fact was reported by the Bureau to the State Board of Pharmacy, which notified the manufacturers of the product that they must label their containers so that the word "Poison" and the name of the poisonous ingredient would appear in red ink on the label. This has subsequently been done.

Since the sale of this product for the purpose indicated can not be prohibited if it is properly labeled, users are cautioned that cyanides in any form are poisonous and may cause death by inhalation of the fumes, absorption through abrasions of the skin or by being carried to the mouth on the hands.—*Health News*, N. Y. State Department of Health, Jan. 28, 1929.

COMMUNICATIONS

A LETTER FROM HILDING BERGLUND TO A COLLEAGUE IN MINNEAPOLIS

Peking Union Medical College, Peking, China,

December 7, 1928.

I feel a little ashamed for not having written before but I have not written anyone except the Dean once. I wanted to let my impressions settle before I tried to put them on paper and I also wanted to see sufficient of the clinical material, to know what we have and what we have not. We have a medical service of about the same size as our service in Minneapolis and the hospital as a whole also corresponds very closely to the size of the University Hospital. All the practical subjects are pretty well represented and the habit of consultations between departments is developed to what I should call a normal degree so that I see or know of everything interesting.

As to the not infectious diseases the most remarkable thing is an almost complete absence of hypertension. The average blood pressure in our ward patients is also lower than at home. The systolic pressure seldom reaches 100 mm. Arteriosclerotic eye ground changes are rare and very little developed. In a peculiar contrast to this behavior of the smaller vessels stands the susceptibility of the larger arteries in thrombo arteritis obliterans, of which there is an abundance in young people. Hyperthyroidism is very rare. I have seen only one case in a pupil nurse and with a basal rate of plus 70 she presented practically no nervous symptoms nor eye changes. Gastric and duodenal ulcers are less common than at home, and I believe the same holds true for gallbladder diseases. Another thing which is definitely rare is diabetes and the cases we have seen have been mild. We are testing the secretory function of the stomach by means of histamin and in one hundred and sixty consecutive cases from the dispensary and the wards we have so far found no case of achylia. I believe that we also dare to say that in northern China pernicious anemia is unknown. On the blood question, which is very interesting, I am writing Watkins in detail. I am in January going down to a medical congress in Shanghai and one of the topics is the anemias in China. Cirrhosis of the liver is very common, both of the ordinary type and of the Banti type, if such a type exists, and we have removed five or six spleens from which we, like investigators in other parts of the world, cultivate a fungus. Whether this fungus plays any rôle as an etiological factor or is there as a secondary invader or saprophyte we do not know, but we are carrying on animal work both in monkeys and in smaller beasts. The beneficiary result of splenectomy is amazing and hard to explain, since the liver in all cases is markedly cirrhotic. Nevertheless, ascites usually disappears. Further, we have a great number of nephrosis cases. I started to analyze them but was soon side-tracked by the Bantis and by the anemias. A wonderfully developed case of scurvy came down from Mongolia, where they have plenty of it. In Mongolia most everybody is said to have syphilis, which reveals another peculiarity. There is plenty of untreated syphilis of all kinds in Peking, too, for that matter. Leprosy of course we have. We even had a leprosy autopsy the other day—a physician from Cuba. Actinomycosis is not uncommon, and a few days ago one of our internes recognized a case of monila pulmonis in an old Chinese political leader from the early days of the revolution. A case of echinococcus came to autopsy with a few hundred cysts, destroying the right femur. Pictures are enclosed. A case of chyluria we saw in the wards; we were unable to find any filaria in the blood. The interesting point was that when the patient was walking around, his urine was clear. When he was lying down flat the urine became like heavy cream and coagulated spontaneously, containing besides the fat and the fibrin also globulin and albumin. Unfortunately we were not able to find out where the leakage into the urinary tract was localized. But the demonstration of the valve mechanism connected with the leakage, I believe, was a new observation.

Of contagious diseases, tropical or subtropical, we have a variety. It is a little queer to write the word "tropical" and to remember the hot days of August a day like today, when a gale is blowing outside and the temperature seems to be rapidly approaching zero. Typhoid, bacillary dysentery and amebic dysentery are endemic. Typhus we have had some cases of and more is coming as the winter weather necessitates more dirty clothing. When I first came we had in one week two cases of hydrophobia and two cases of anthrax. Arsphenamine in doses of .6 to .9 daily for three to four days has wonderful effect in anthrax. Kala azar is not very rare but seems to be diminishing. Our cases have been fairly late and we are running a high mortality. Noma is a common complication and very difficult to do anything worth while against.. Suppurative parotitis has been a fairly common complication in some of our typhoids that have come in late. The typhoids, by the way, are running a high mortality of about 16 per cent. We have had some cases of encephalitis but no polio since I came.

This all makes a medical situation of extreme interest. We, the newcomers from the States this fall, have taken a few hours with our very pleasant man in parasitology, Dr. Khaw, and I have learned to appreciate not only the practical importance of parasitology in the Orient but also the importance of parasitology as a detached subject as represented by Riley in our zoology department in Minneapolis. I certainly did not know that the ascaris radically changed its habits of living and propagation in 1916. You can hardly imagine the amount of interesting material parasitology involves, of which we have no or little knowledge among medical men. Rogers, the great English hero in Tropical Medicine, coined the phrase that "In the Orient the microscope takes the place of the stethoscope" and to a great extent he is right.

The life in Peking is just as interesting as the medi-

cal situation. Of local medical meetings we have a scientific meeting in the P. U. M. C. twice a month, another meeting in Chinese of the National Medical Association of China once a month and a meeting of the Society of Experimental Biology and Medicine as often as needed.

If you think this letter is of sufficient interest to some of the men we know, you might tell them about it at some academy meeting and at the same time convey to the academy my respectful greetings.

The Christian Science Watchman
20 Jackson Place N. W.
Washington, D. C.

December 1, 1928.

To The Editor:

The tragedies that have been permitted in the name of Christian Science by its overzealous devotees have largely justified the widespread prejudice against it. The Christian Science Parent Church, the independent movement in Christian Science, is endeavoring to bring a new spirit of sanity and common sense into the practice of mental healing. It recognizes the unselfish, humanitarian labors of the medical profession in alleviating human suffering. It likewise recognizes the vital function of spiritual forces in relation to health. It is convinced that there exists a basis of coöperation on which medicine and religion may thrive together for the advancement of world health.

Since Mrs. Eddy's death, Christian Science practice has become very largely a commercialized faith-cure. The record of disease and death among Christian Scientists during the last few years is appalling. Because of a superstition that the use of a drug is an evil and the employment of medical aid tantamount to a confession that Christian Science has failed, the majority of the adherents of that faith turn to medical assistance only as a last resort, usually secretly and with the depressing conviction that they are committing a positive sin. The official attitude of the Boston Christian Science Church, as widely published by its authorized spokesman, is that *"Advocating cooperation between Christian Science and medicine is an absolute denial of the Christ, Truth."* Such an attitude tends to nullify the work of the physician and deplete the patient's mental capacity for recuperation. Frequently the doctor is called only when death is considered imminent, and to prevent, if possible, the embarrassment of an inquest.

These conditions have arisen from a misconception of Christian Science in its larger application. In order to prove to an incredulous world that the body can be healed by Mind, drugs were discarded during the early stages of the movement. Nevertheless, it is a recognized fact in Christian Science that a drug may be the medium through which the common faith and hope of the majority of mankind expresses itself. In the personal experience of Mrs. Eddy there came a time when neither her own nor her followers' unaided faith was sufficient to relieve her of serious suffering. Understanding the effect of the faith of the majority of mankind in medical science she decided to utilize it, and gratefully availed herself of the services of reputable physicians on various occasions.

In so doing, she was consistent with her own teaching on the relation of a minority's faith in Mind-power to a majority's faith in material means. She was far in advance of her followers' practical application of Mind-Science. Had her example been intelligently followed by her students, Christian Science practice would today hold a higher place in the general estimation of the world.

The Christian Science Parent Church was organized a few years ago under the leadership of Mrs. Annie C. Bill. It has developed branches throughout Great Britain, America, Australia, and elsewhere. Its members have been recruited almost entirely from those who have resigned from the original Boston Christian Science organization after they became convinced that the trend of thought within that body precluded further advancement of Mind-Science.

The Parent Church maintains that the work of the Christian Scientist is limited to the teaching of spiritual truth, and to removing fear and other unhealthful moral conditions. Its members are forbidden by their Church By-laws to meddle in any way with medical or surgical practice, but must leave such work to those who are qualified and legally authorized for that responsibility. Neither shall a practitioner of this Church render his services unless both patient and attending physician request his aid.

Spiritual healing has a definite place in therapeutic practice. Therefore, in order that it may be utilized under such conditions as will keep it within its proper field and insure the maximum results, we bespeak the intelligent coöperation of the medical fraternity and the press.

Yours very truly,
A. M. Vickery,
Editor.

NITRITES IN SEASICKNESS

Sodium nitrite and glycerol trinitrate (nitroglycerin, which has the physiologic action of nitrites) have been used in seasickness but they have not been proved to be specific. From 3 to 5 grains (0.2 to 0.3 Gm.) of sodium nitrite are given at two-hourly intervals for several doses and may be used as a preventive or a curative. (Jour. A. M. A., December 1, 1928, p. 1738.)

BOUILLON CUBES

These do not contain a great deal of nourishment. A four ounce (120 c.c.) portion of liquid bouillon contains approximately 2.5 Gm. of protein, and no fat or carbohydrate, and has a fuel value of 13 calories. The only relation of bouillon cubes to food lies in their stimulating effect on the gastric juices. (Jour. A. M. A., December 22, 1928, p. 2015.)

MISCELLANEOUS

PITUITARY HORMONES

For his work in an investigation of the ductless glands, and particularly in his isolation of pituitary hormones, Dr. Oliver Kamm, director of chemical research of Parke, Davis & Company, manufacturing chemists, has been awarded the $1,000 prize by the American Association for the Advancement of Science for the "most noteworthy contribution to science presented at the annual meeting."

Some 2,000 scientists delivered addresses at this meeting, which was held in New York. The award was announced on January 2 by Dr. Henry Fairfield Osborn, president of the Association.

The isolation of two hormones from the posterior lobe of the pituitary gland, as revealed by Dr. Kamm, is held by chemical scientists to be equal in importance to the isolation of insulin and the discovery of adrenalin.

Dr. Kamm isolated the alpha and beta hormones of the posterior pituitary after twelve years work in the Parke-Davis Research Laboratories. This, incidentally, in the first time that anyone has demonstrated that one gland might contain more than one hormone.

The alpha hormone is the so-called oxytocic principle. The beta hormone is the blood-pressure-raising principle. Dr. Kamm also showed definitely that the beta hormone has the power of controlling the excessive output of water. His paper before the American Association for the Advancement of Science showed that it has been a mistake to refer to the so-called "renal activity" of pituitary extracts.

The beta hormone does not act upon the kidneys, but controls the utilization of water by the individual tissues of the body.

The usefulness of this beta hormone is now under investigation in diseases characterized by excessive loss of water, such as diabetes insipidus, burns, cholera, other infectious diseases, and surgical shock.

Dr. Kamm points out in his prize-winning paper that much depends upon the ability of the body tissues to retain and utilize water. He said:

"The dangerous symptoms following surgical anesthesia are due mainly to the dehydration of tissues, and the use of beta hormone prevents such desiccation.

"Following extensive body burns, it has been thought that death results from the absorption of toxins. According to the newer view, however, it may be the result of the desiccation of the body tissues. In such cases, if this were proved true, the use of a drug like the beta hormone might possibly save life by favoring the retention of water in the tissues. It is conceivable that something quite startling might flow from this idea in cases of serious burns.

"Water-intoxication, with its alarming symptoms leading even to unconsciousness, is very rare. The other extreme, that of water-poverty, is rather more common, and is characterized by extreme thirst and excessive elimination of water. This condition, known clinically as diabetes insipidus, is relieved at least temporarily by pituitary extract, and it has just been found that the beta hormone possesses this remarkable action.

"Although other factors are also involved, it appears that proper hydration is needed for the growth of tissues. In this respect, few of us are absolutely normal. We find that some individuals are extremely sensitive to the action of the beta hormone—they are the 'physiological wets'; while others readily return to normal after administration of the hormone—they are the 'physiological drys.'

"It has just been observed that the fleshy type of individual is almost invariably of the wet type, whereas the slender, scrawny person is usually a dry. The suggestion is therefore made that we have here possibly one of the important explanations as to why the former is fleshy and why the latter fails to gain weight readily in spite of an excessive intake of food and water. It is apparent that the portly person who is desirous of reducing must cut down on his liquid intake, as well as on his intake of solid food. As for the scrawny person, gland therapy may possibly be indicated, but here the work still is in the investigative stage and conclusions cannot be drawn.

"Only a very few grams of highly purified alpha and beta hormones are as yet available. Commercially they are known as pitocin and pitressin, respectively. Although the Parke-Davis Research Laboratories use the methods of micro-analysis, a single laboratory experiment requires the pituitary glands of 50,000 cattle."

In prefacing his address, Dr. Kamm told the American Association for the Advancement of Science, that:

"Man is on the threshold of a great chemical era. As the number of products derived directly from nature is decreasing, the field of synthetic possibilities is continually increasing, and as a result the possibility of producing new or related drugs will continually increase."

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

State of Minnesota vs. Robert G. Errington

Robert G. Errington entered a plea of guilty in the District Court of Lac qui Parle County, Minnesota, on December 11, 1928, and was sentenced on December 20, 1928, by the court to pay a fine of $500.00 and the court costs for violating the Minnesota Basic Science Law.

The court costs were paid by the defendant and the fine was suspended on the condition that the defendant absolutely refrain from practising the healing art in this state.

The specific charge against the defendant was that he attempted to treat a case of infantile paralysis for which he was paid the sum of $500.00 in cash. The court was informed by counsel for the defendant that Errington was no longer a resident of the state.

The court was inclined to suspend the sentence in this case due to the fact that the defendant no longer

resides in the State of Minnesota and is under a suspended sentence of five months imposed by Judge Baker in June for a violation of the Medical Act, at which time Errington served thirty days in the County jail at Olivia, Minnesota.

STATE OF MINNESOTA VS. J. E. DUFORT

J. E. Dufort has been practising at Northome, Minnesota, as a physician and surgeon for the past fourteen years. He was given a chance to close his office and get out of the business in July of this year but he did not do so.

A complaint was filed against the defendant under the Basic Science Law (December 10, 1928) charging him with maintaining an office in Northome for the diagnosis and treatment of ailments. On December 22 the defendant entered a plea of guilty at Park Rapids and was sentenced to one year in the county jail, sentence suspended on the condition that Dufort cease practising in any way, shape, or manner in the State of Minnesota and on the further condition that he move his residence from Koochiching County.

This suggestion in reference to Dufort's moving out of the county was made by the board for the reason that if Dufort remained in the same locality that he had practised in for fourteen years he would be more than likely to engage in the healing art. Judge Wright thought the suggestion very appropriate and made it one of the conditions on which the sentence was suspended. Dufort was informed by the court that the suspension of his sentence would most assuredly be revoked unless he complied with these two conditions.

OBITUARY

Dr. Frank W. Metcalf

Following a short illness Dr. Frank W. Metcalf of Fulda, Minnesota, died at his home Monday, January 7, 1929. Death was due to pneumonia.

Frank Woodward Metcalf was born at Dodgeville, Wisconsin, on October 8, 1875. Here he attended the public schools, later entering the University of Wisconsin. In 1898 he served as County Superintendent of Schools for Iowa county, Wisconsin.

Although successful in his teaching profession, his heart was with medicine, and he returned to the University of Chicago to resume his studies. In 1907 he graduated from Rush Medical College, and, following a two year internship at the Presbyterian hospital at Chicago, entered the practice of medicine. He first settled at Soudan, Minnesota.

In November, 1909, he returned east, and on the 25th of that month was united in marriage to Miss Maud Langston, at Niles, Michigan. The young couple made their first home at Winton, and on January 1, 1919, moved to Fulda.

Associated with him in his Fulda practice was Dr. Stanley, and in 1920 the two doctors joined in the organization of the Clinic at Worthington, Dr. Stanley moving to that city.

Dr. Metcalf remained at Fulda, and in the decade he practised his profession there he was a central figure in the professional and business life of the village. The tribute paid Dr. Metcalf in the Fulda Free Press states that he was never too busy for a few words of encouragement or friendly chat. His invigorating personality cheered many a sick room and many a forlorn heart. As president of the Fulda Community Association, Dr. Metcalf did more than any other individual to foster and maintain cordial, friendly relations between the people of the community. He was a member of the Masonic and Eastern Star orders, and of the Presbyterian church.

"Dr. Metcalf was exceedingly fond of his home and devoted to his family. His greatest pleasure was in working about his home yard, and in anticipating and providing his wife and daughters with the comforts of life. His was the ideal life, and the Fulda community is justified in mourning with the family this splendid man 'who went about doing good.'"

Dr. Metcalf is survived by his wife and three daughters, Sarah, Mary and Maud, as well as two brothers, Alec, of Dodgeville, Wisconsin, and Walter, of Porterville, California, and one sister, Mrs. R. F. Jones of Dodgeville.

Dr. Peter A. Aurness

Dr. Peter A. Aurness, 68 years old, prominent Minneapolis physician and surgeon, died Monday, December 17, following an illness of over a year. He was born in Norway and there received his preliminary university education. He came to Minneapolis in 1887 and attended the University of Minnesota medical school, from which he graduated in 1890.

Taking up the practice of his profession in the city he became one of the first physicians on the staff of the Norwegian Deaconess hospital.

Dr. Aurness is survived by his wife, Ida M. Aurness; one son, Rolf C.; two granchildren—all of Minneapolis; and a brother in Norway.

Dr. F. M. Smersh

Dr. F. M. Smersh, president of the Owatonna Board of Health, died December 28, 1928. He had been suffering from bronchial pneumonia.

Dr. Smersh was prominent in civic affairs, and in local and national medical and public health associations.

He is survived by his widow, two sons, Dr. Jerome Smersh and Clement Smersh of Owatonna, and a daughter, Mrs. Herbert Clefton of Minneapolis.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION

The next annual meeting of the Minnesota State Medical Association will be held in St. Paul, at the Masonic Temple, on May 13, 14 and 15 and will be of unusual interest. The program committee has been exceptionally fortunate in securing Dr. Elliot P. Joslin, Professor of Medicine, Harvard University, and Dr. George P. Muller, Professor of Surgery, U. of Pennsylvania, as speaker. Dr. C. W. Hopkins, Chicago, Chief Surgeon of the Northwestern Railway, and Dr. Henry G. Bugbee, New York, Urologist, have also been invited.

The Medical Economics meeting will be held Monday night, May 13. Michael Davis of the Julius Rosenwald Foundation, Dr. Morris Fishbein and others will discuss "The High Cost of Medical Care."

On Monday morning clinics will be held, the afternoon being devoted to a symposium on fractures under the auspices of the Minnesota Orthopedic Club. Tuesday and Wednesday will be given to an intensive program on other scientific and medical subjects. A banquet will be held Tuesday night.

The motion picture known as the "Canti Cancer Film" will be exhibited. The film was prepared in London. It depicts in three reels the growth and division of cells in tissue culture and the effect of radium on normal and malignant cells.

Numerous commercial and scientific exhibits and clinical demonstrations will be held during the meeting.

AMENDMENTS TO THE CONSTITUTION

Article XIII of the Constitution of the Minnesota State Medical Association reads as follows:

"The House of Delegates may amend any article of this Constitution by a two-thirds vote of the Delegates present at any Annual Session, provided that such amendment shall have been presented in open meeting at a previous session, and that it shall have been published twice during the year in the bulletin or journal of this Association, and sent officially to each component society at least two months before the meeting at which final action is to be taken."

The following amendments have been presented in open session and have been published once in MINNESOTA MEDICINE.

ARTICLE IV—COMPOSITION OF THE ASSOCIATION

Sec. 1. This association shall consist of Members, Delegates, Affiliate Members, Honorary Members, Associate Members and Guests.

Sec. 4. Affiliate Members. Affiliate members shall be those members of component district or county medical societies, who have held such membership for a period of 25 years, and have reached the age of 65 years, or, through physical disability, are unable to engage in active practice, and who, upon their own request to their district or county society, shall have been declared Affiliate Members of such district or county societies.

Sec. 5. Honorary and Associate Members. Honorary and Associate members shall be those elected to such membership by the House of Delegates on recommendation of the Council.

OCHSNER MEMORIAL LECTURE

The third Albert J. Ochsner Memorial Lecture of the North Side Branch of the Chicago Medical Society will be given by George W. Crile, of Cleveland, on Thursday, February 21, 1929, at the Germania Club, Germania place and Clark street, Chicago.

This lecture will be preceded by a banquet in honor of Malcolm LaSalle Harris, President Elect, and Frank Billings, Arthur Dean Bevan and William Allen Pusey, Ex-Presidents of the American Medical Association of Chicago.

President William S. Thayer, the members of the Board of Trustees and other officers of the American Medical Association have accepted an invitation to these events.

Those desiring to make reservations should communicate with Miss Wolff, 25 East Washington street, Chicago.

CONFERENCE OF SECRETARIES

A Conference of the secretaries of the component medical societies of the Minnesota State Medical Association will be held at the St. Paul Athletic Club, Saturday, February 23, 1929. Dr. Olin B. West, Secretary of the American Medical Association, will be present. An interesting program is planned and it is hoped that each society will be represented.

MINNEAPOLIS SURGICAL SOCIETY

The Minneapolis Surgical Society will hold its annual formal dinner meeting at the Nicollet Hotel, Thursday, February 7. Dr. A. R. Colvin of Saint Paul will speak on "The Manifold Nature of Osteomyelitis."

HENNEPIN COUNTY MEDICAL SOCIETY

Dr. N. O. Pearce succeeded to the office of president of the Hennepin County Medical Society at the annual meeting of the Society. Dr. Pearce also is president of Hennepin County Tuberculosis Association.

Dr. A. E. Hedback, retiring president, was elected chairman of the executive committee. Dr. Edwin L. Gardner is the new first vice-president and Dr. A. H. MacFarland, second vice-president.

ST. LOUIS COUNTY MEDICAL SOCIETY

The St. Louis County Medical Society planned a series of medical extension lectures for the winter months extending from December through March. The

program for the February and March lectures is as follows:

February—"Industrial Factors in the Production of Lung Diseases," Dr. Middleton, Madison, Wis., and "Functional Heart Disease and the Systolic Murmur," Dr. Fahr, Minneapolis.

March—Discussion on anesthesia in its various phases with a demonstration, Dr. Waters, Madison, Wis., and a lecture by Dr. McLean.

RICE COUNTY MEDICAL SOCIETY

Members of the Rice County Medical Society, the society auxiliary and nurses in the district were guests of Dr. and Mrs. J. M. Murdoch of Faribault at the State School for Feeble Minded, Thursday, January 24.

A supper was served the guests at 6:30 o'clock, following which a program was presented including musical and dramatic selections given through the courtesy of the State School.

Among the speakers of the evening were the following: Mrs. A. M. Hanson, secretary of the Medical Auxiliary, Faribault, "County, State and National Auxiliaries"; Mr. F. Maley Brist, investigating attorney for the Minnesota State Board of Medical Examiners, Address on the work of the Board; Dr. W. H. Rumpf, Minneapolis, "Maternity Mortality in Minnesota."

Dr. C. R. Wall of Northfield was elected to membership.

C. J. Plonske, M.D.
Secretary.

OF GENERAL INTEREST

Dr. F. H. Magney of Duluth has been elected president of the Professional Men's club of that city.

Dr. Egil Boeckmann, Saint Paul, has been elected a director of the First National Bank of Saint Paul.

Dr. D. C. Frise of Minneapolis was recently elected president of the Men's Club of the Church of the Redeemer.

Dr. James K. Anderson, formerly of Crookston, has moved to Minneapolis, and has opened offices in the La Salle Building.

Dr. C. N. McCloud of Saint Paul, who has been medical director of the Minnesota Mutual Life Insurance Company for several years, has been elected a vice president of the company.

Dr. David Kadesky, St. Paul, is en route to Europe, where he will do additional graduate work in medicine. Dr. Kadesky will study in Germany and Austria. He is expected to return to St. Paul in nine months.

Announcement has been made of the engagement of Mary Ayre Law, daughter of Dr. and Mrs. A. A. Law of Minneapolis, to Mr. John MacDonald Webb, son of Mr. and Mrs. Robert W. Webb of that city.

Two Saint Paul doctors were honored in the election of officers of the Sons of the Revolution at the recent annual meeting of that organization. Dr. H. O. Skinner was elected president and Dr. Charles R. Ball, vice president.

Dr. S. L. Murphy has returned to his offices with the Murphy Radium Service, 602 Nicollet Avenue, Minneapolis, after a year of post-graduate work in oral surgery and the *x*-ray diagnosis of oral, sinus and related lesions.

Information has been received that there is a good opening for a physician at Northome, Minnesota, a town between Bemidji and International Falls. There is at present no physician in the town nor within a radius of twenty-five miles.

Among the guests who will address the annual meeting of the State Medical Association will be Dr. Elliott P. Joslin, professor of medicine at Harvard University, and Dr. George P. Muller, professor of surgery at the University of Pennsylvania.

Application blanks for the Scientific Exhibit for the Portland session of the American Medical Association may be obtained upon request from the office of the Minnesota State Medical Association, 11 West Summit Avenue, Saint Paul, Minn.

Dr. Paul B. Cook of Saint Paul sailed for Africa, in January. He will land at Mombasa, Africa, and with a party of eight will travel inland to the Nile river. They will cruise the length of the Nile for big game hunting. Dr. Cook will return to St. Paul after three months.

Seniors in the University of Minnesota medical school will spend an internship of three weeks in one of Minnesota's three hospitals for the insane, at St. Peter, Rochester and Fergus Falls, according to an arrangement recently completed by Dean E. P. Lyon of the school, with the state board of control.

Dr. George W. Caldwell assumes his duties as pathologist at the Miller Hospital, Saint Paul, February 1. Dr. Caldwell received his training under Dr. Gideon H. Wells of Chicago and later became professor of pathology at Baylor College at Dallas, Texas. He comes to Saint Paul from Mineral Wells, Texas.

The conference of secretaries of the affiliated societies of the State Medical Association will be held this year at the St. Paul Athletic Club, February 23, 1929. Dr. Olin B. West, secretary of the American Medical Association, will address the meeting. Dr. Herman Johnson will tell of the legislative program contemplated this year.

The American Medical Association is sending to a group of physicians, picked at random, a questionnaire on the cost of medical education and gross net incomes. These questionnaires should be answered and returned promptly. It is desired that this study

be impartial and representative as it will probably be used to answer assertions now made by those who are not of the medical profession.

The renewal license fee of five dollars to the Minnesota State Board of Medical Examiners was due January 1. Physicians are allowed the month of January before the payment becomes overdue. Statements were issued in December to all licensed physicians but a number have failed to remit. The Board is forced to rely on this fee to carry on its activities.

Dr. James R. Manley of Duluth gave a special series of lectures to a post-graduate class in surgery and obstetrics at the University of Kansas and also at the University of Oklahoma at Oklahoma City late in January in response to a special invitation received from the two universities. Dr. Manley is one of five doctors chosen from among prominent surgeons throughout the country to give the special lectures.

Amended articles of incorporation of the League Against Compulsory Medication, originally incorporated in 1925 in Ramsey County and now moving its headquarters to Minneapolis, were recently filed with the Hennepin County Register of Deeds. H. E. Soule is named as president and Harold Solem as secretary of the league. The general purpose of the league will be to educate the public against serum therapy and the use of vaccine virus; to oppose compulsory vacinnation, inoculation, medication and bodily inspection and "to bring about reforms in the methods of public health administration."

HENNEPIN COUNTY MEDICAL SOCIETY WILL HAVE NEW QUARTERS

Members of the Hennepin County Medical Society will be housed in the fourth largest medical building in the United States, and what is hoped will be the medical center of the northwest, when they move into their new quarters in the Medical Arts Building, Minneapolis, July 1.

A fifteen year lease has been taken by the Society for the entire nineteenth floor of the new building, which will have space for 250 doctors and 100 dentists.

The top floor includes an auditorium with a seating capacity of 600, which will be equipped with complete facilities for medical lectures, meetings, exhibition of lantern slides and motion pictures. A library will be provided, with double any space available before, and lounging and reading rooms facing an open air terrace overlooking the entire city will be a feature of the new quarters. Persons wishing to do special study will be allowed the use of individual cubicles, and records and secretarial help will be provided.

Comfortable chairs, a large fireplace, rugs, lamps, and tables, will furnish the lounge, where physicians may meet and entertain their friends, and ample kitchen quarters will be provided.

Included in the building will be dental supply houses, a dental laboratory, optical companies, a prescription drug store, and other tenants approved by the group.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council of Pharmacy and Chemistry of the American Medical Association.

Abbott Laboratories
- Ampules Dextrose, 20 c.c.
- Ampules Dextrose, 50 c.c.
- Tablets Cinchophen-Abbott, 5 grains

Armour & Co.
- Concentrated Liver Extract-Armour

Eli Lilly n Co.
- Ephedrine Hydrochloride-Lilly
- Pulvules Ephedrine Hydrochloride, 3/8 grain
- Pulvules Ephedrine Hydrochloride, 3/4 grain
- Solution Ephedrine Hydrochloride-Lilly, 3%.

MacDowell Bros.
- MacDowell's Wheat-Nut-Casein Dietetic Flour

Merck & Co., Inc.
- Bromipin 33 Per Cent

H. K. Mulford Co.
- Pirquet Test for Tuberculosis (Bovine Type)
- Tuberculin Ointment (Moro Ointment) (Bovine Type)
- Tuberculin Intracutaneous (Bovine Type)
- Antivenin (Bothropic)

National Drug Co.
- Diphtheria Antitoxin
- Normal Horse Serum
- Pertussis Vaccine
- Pneumococcus Vaccine
- Rabies Vaccine-Human (Semple Method)
- Smallpox Vaccine
- Staphylococcus Vaccine
- Tetanus Antitoxin (Concentrated)
- Typhoid-Paratyphoid Mixed Vaccine
- Typhoid Vaccine
- Antistreptococcic Serum
- Typhoid-Paratyphoid A Vaccine

Parke, Davis & Co.
- Scarlet Fever Streptococcus Toxin for Preventive Immunization-P. D. & Co.

E. R. Squibb & Sons
- Sulpharsphenamine-Squibb, 0.9 Gm. Ampoules
- Tablets Ephedrine Hydrochloride-Squibb, 3/8 grain
- Tablets Ephedrine Hydrochloride-Squibb, 3/4 grain

TRUTH ABOUT MEDICINES

Syrup Ephedrine Hydrochloride (Double Strength)-Swan-Myers.—It contains ephedrine hydrochloride-Swan-Myers (New and Non-official Remedies, 1928, p. 176) 0.4390 Gm., in 100 c.c. (1/4 grain per fluidrachm) and alcohol 12 per cent. Swan-Myers Co., Indianapolis.

Squibb's Mint-Flayored Cod-Liver Oil.—Cod liver oil-Squibb (New and Non-official Remedies, 1928, p. 253) containing 0.67 per cent of oil of spearmint as flavoring. E. R. Squibb & Sons, New York.

Tetanus Antitoxin (Bovine).—A tetanus antitoxin,

concentrated (New and Non-official Remedies, 1928, p. 357) derived from the blood serum of cattle immunized against the toxin of B. *tetani*. Marketed in packages of one syringe containing 1,500 units (one immunizing dose). H. K. Mulford Co., Philadelphia.

Capsules Ovarian Substance, Desiccated-P. D. & Co., 5 grains.—Each capsule contains 5 grains of ovarian substance, desiccated-P. D. & Co. (New and Non-official Remedies, 1928, p. 290). Parke, Davis & Co., Detroit.

Tablets Whole Ovary-Lederle, *2 1/2 grains.*—Each tablet contains 2½ grains of whole ovary-Lederle (New and Non-official Remedies, 1928, p. 292). Lederle Antitoxin Laboratories, New York.

Rabies Vaccine-Gilliland (Semple Method).—An antirabic vaccine (New and Non-official Remedies, 1928, p. 363) prepared according to the general method of David Semple (phenol killed). Marketed in packages of fourteen syringes each containing 2 c.c. The Gilliland Laboratories, Inc., Marietta, Pa.

Antipneumococcic Serum. Type I.—This antipneumococcus serum (New and Non-official Remedies, 1928, p. 361) is also marketed in packages of one 50 c.c. gravity container. E. R. Squibb & Sons, New York.

Antistreptococcic Serum-Squibb.—This antistreptococcus serum (New and Non-official Remedies, 1928, p. 362) is also marketed in packages of one 50 c.c. gravity container. E. R. Squibb & Sons, New York. (Jour. A. M. A., December 8, 1928, p. 1805.)

Salyrgan—Mersalyl.—Sodium {o-[hydroxymercuric-methoxy-propylcarbamyl] phenoxy} acetate.—Salyrgan contains 39.6 per cent of mercury in nonionizable form. Salyrgan has been demonstrated to exert a destructive action on the spirochete of syphilis in rabbits, but is used chiefly as a diuretic. It induces diuresis only provided sufficient renal tissue is still intact, and is therefore contraindicated in acute diseases of the kidney as well as in advanced nephritis. It is effective in ascites and edema of cardiac and cardiorenal origin; also in ascites resulting from cirrhosis of the liver. Salyrgan is supplied only in the form of a 10 per cent solution in ampules of 1 c.c. and 2 c.c. H. A. Metz Laboratories, Inc., New York.

Bromipin 33 Per Cent—Brominized Sesame Oil 33 Per Cent-Merck.—A bromine addition product of sesame oil, containing from 31 to 35 per cent of bromine in organic combination. It acts like the inorganic bromides. The combination is not broken up in the stomach; but a portion of the bromine is split off in the intestine; the remaining compound is readily absorbed and largely deposited in the tissues, where it is slowly split up. The product is also used as a contrast medium for roentgen diagnosis of the tracheobronchial tree. It is stated to be applicable in cases of mild or medium tuberculosis in which the use of an iodized oil is contraindicated. Merck & Co., Inc., Rahway, N. J. (Jour. A. M. A., December 22, 1928, p. 1995.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of Nov. 14, 1928

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town & Country Club on Wednesday evening, November 14, 1928, at 8 o'clock. Dinner was served at 7 o'clock.

The meeting was called to order by the President, Dr. C. N. McCloud. There were 36 members and 1 visitor present.

Minutes of the October meeting were read and approved.

Dr. S. E. Sweitzer (Minneapolis) presented a patient with pellagra, which he had previously treated. The patient had been in the hospital in July, 1928, and was discharged as cured. Lately he had started drinking about a quart of moonshine a day and came back with relapse of the disease as evidenced by the eruption on the hands and an extremely intractable diarrhea.

A motion was made that the new Constitution and By-laws, as reported on at the previous meeting, be adopted as a whole. Motion seconded and carried.

The scientific program of the evening consisted of the following:

Dr. E. M. Hammes (St. Paul) read a paper on "Delayed Traumatic Intracranial Hemorrhage." (See page 86).

DISCUSSION

Dr. J. F. Corbett (Minneapolis): I am deeply interested in this subject because these conditions that have been referred to are comparatively common. The statistics of the Coroner of Cook County show that a very large number of deaths due to head injuries were caused by extradural hemorrhage. I can recall at least 20 cases of extradural hemorrhage that all recovered after operation except one case, and due to middle meningeal rupture. I can recall one case of subdural hemorrhage from the sigmoid sinus where bleeding was slow; that is, symptoms became apparent after four days. All cases of middle meningeal hemorrhage have come on in a short time, from instantly to 18 to 20 hours. The diagnostic points were progressive development of symptoms, but in one of the cases the condition was almost instantaneous with no interval.

While these cases of extradural hemorrhage are comparatively common, occasionally we get an uncommon one and then they are interesting. I recall a case of pachymeningitis hemorrhagica interna. This man I saw in the hospital. I did not know what was the matter with him. He went to Rochester and the real condition was missed there. Two months later he came back here and we explored him and found a large pachymeningitis hemorrhagica interna about the size of an egg.

Two other cases I want to take time to mention. One was a boy who was struck by an automobile. He had

a badly fractured femur; was given an anesthetic and the femur was reduced. After he recovered from the anesthetic he became paralyzed on one side of his body and became unconscious. When I opened the skull there seemed to be nothing outside of the dura but I could feel a great deal of bulging so I went through the dura and what I found there was simply a large amount of water—about 2 ounces. We expected a brilliant result, but the patient died. There couldn't possibly have been any bleeding, as the fluid was perfectly clear. This accumulation of serous fluid occurred underneath the dura. The other two cases were deep hemorrhages. One of these I explored and found a blood cyst, which I drained. The other one came on liwe a hemorrhage. Nothing was seen when I opened the skull. I went through the dura; there was bulging on the surface, I picked a hole in it and out came blood and it kept coming. I thought I had punctured a large artery. Fortunately the temporal muscle was lying near and I cut off a large piece of that and pushed it down into the open artery. After the operation he got control of the hand and forearm but he had a spastic condition of the upper arm on that side.

We do occasionally in the literature see cases of extreme delay of symptoms of brain hemorrhage following trauma, the symptoms coming on at a late period, and claimed to be a true hemorrhage apparently coming on very late after an injury. The explanation Dr. Hammes gave seems reasonable. I have never seen a case of traumatic delayed hemorrhage that would stand the test of Stadelman's Rules. It is, however, possible outside of a pachymeningitis that such may occur, but I have never been able to prove it.

Dr. Robert Earl (St. Paul): One of the patients whom Dr. Hammes reported was unconscious 24 hours before the operation. Novocain with adrenalin was used locally, although these were not needed. The man was unconscious throughout the operation and never regained consciousness. There was a large subdural blood clot with adhesions to the dura. There was a considerable amount (about 2 ounces) of dark serous fluid in the cyst in the center of the blood clot. Had this been the only lesion we should have expected that the man would have regained consciousness while on the table, but he did not. I made a spinal puncture about sixteen hours after the operation was completed, but there was no blood in the fluid withdrawn. The spinal puncture was made to assist in determining whether or not the patient had a secondary hemorrhage which later caused his death.

With reference to the length of time after a head injury until the development of symptoms, I believe that in the case of injury to a small vessel, it may be a matter of a few hours before enough blood has leaked out to cause pressure symptoms or localizing signs. Then we have other cases in which localizing signs and symptoms of intracranial pressure do not develop for weeks, months or years. I have operated one man who was kicked by a horse and did not develop intracranial symptoms until 20 years after the injury. At operation I turned down a bone flap and directly under the scar I found a cyst which had formed in the old blood clot, causing sufficient intracranial pressure to cause gradually increasing hemiplegia and coma. The man regained consciousness while on the table and made a complete recovery.

I believe that in considering delayed symptoms from hemorrhage, we must think of the development of a cyst in the blood clot and that it is really the formation of the cyst which causes increased intracranial pressure sufficient to give late symptoms. In cases in which the symptoms from intracranial hemorrhage develop a few hours after the injury, a small slowly-bleeding vessel has been injured.

Dr. A. Schwyzer (St. Paul): From the surgeon's standpoint I want to add a thing or two. When we have a ruptured meningeal artery we go at it in the temporal region where it bifurcates. If you go in there and find nothing you may think it might be on the other side and you may find nothing there either, and still it may be an epidural hematoma. I recall that my former chief, Professor Kroenlein, had such a case, which was of great significance. The hematoma was far back under the parietal bone. The posterior branch of the middle meningeal artery had been ruptured. If it occurs that the hematoma is far back, unless you make a large flap or unless you probe far back, you are liable to miss it. I want to mention another observation. A man was brought to the hospital unconscious after an injury to his head in the parietal region. He gradually improved and left the hospital without having had an operation. He came back about two months later and was reasonably well but somewhat quiet. That might have been his personality. He was sent home again. They brought him back after more than four months. He was then very sluggish in mentality, weak, and gradually became more or less unconscious. We opened the skull and found a pachymeningitis hemorrhagica externa. We gathered up 180 c.c. (6 ounces) of bloody fluid, and in addition perhaps 20 to 30 c.c. were spilled. That could never occur unless the condition developed very slowly, because the patient would die from the pressure. The cases which develop symptoms very late after injury are therefore at times due to a secondary irritative condition which is started by the primary hematoma.

Dr. Emil S. Geist (Minneapolis) read a paper on "Loose Bodies under the Semilunar Cartilage." Lantern slides were shown.

DISCUSSION

Dr. Wallace Cole (St. Paul): I think these two cases of Dr. Geist's are very unique. I looked up the literature myself on it after he reported the first case and I have been unable to find anything in the literature telling about this special type of free body. The mechanism of locking is peculiar. If it is an osteodiastasis, did that body come from beneath the bone, become dislodged, and gradually give rise to symptoms as it grew larger?

Dr. A. R. Colvin (St. Paul): Dr. Geist said something very true during the course of his remarks and that is the tragedy of opening a joint and not finding

what you are looking for. Surgeons hesitate to open joints and we ought to be very thankful to Dr. Geist for calling attention to a loose body in that vicinity. I think we have all opened joints and not found what we were looking for and I shall certainly look in that particular place the next time.

Dr. F. E. Burch (St. Paul) reported a case, with lantern slide illustrations, of a plastic operation for the correction of diplopia.

A motion was carried that the President appoint a Committee to draw up resolutions on the death of Dr. Arthur Sweeney, an Honorary Member of the Academy.

The meeting adjourned.

Carl B. Drake, M.D.
Secretary.

Meeting of December 12, 1928

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, December 12, 1928, at 8 o'clock. Dinner was served at 7 o'clock.

The meeting was called to order by the President, Dr. C. W. McCloud. There were 31 members and 1 visitor present.

The minutes of the November meeting were read and approved.

Dr. E. M. Hammes read the following resolutions on the death of Dr. Arthur Sweeney. A motion was carried that these be spread upon the records of the Academy and a copy sent to the family of Dr. Sweeney.

Dr. Arthur A. Sweeney died November 7, 1928, at his home in St. Paul. He was engaged in active practice to within a week of his death. His life of seventy years was well spent. Endowed with a sturdy physique, he was able to devote himself continuously to his profession, in which he developed a large and appreciative clientele. Never content with mediocre work, routine examination, or ordinary explanation, he was ever searching for the new, the unusual, or the odd situations and his studious interpretations of symptoms and findings led to many brilliant diagnoses. Within a practice confined to the diagnosis and treatment of the diseases of the mind and nerves, he developed a position of authority in the field of medical jurisprudence. Upon this subject he lectured for years at the University. He made and held inviolate a reputation of sterling integrity, profound judgment and honesty of purpose in this the most controversial of all fields of the practice of medicine. These qualities were fundamental to his character.

His conduct and deportment were peculiarly free from criticism and his motives were never questioned. While his attitude to the problem of the individual was one of intense interest and application, he devoted himself to the development of studies which related to large groups of the population. Mentality tests and forms of examination of the individual received his enthusiastic attention. The interpretation of these tests and their classification were and are of great value, and may lead to basic changes in the field of pedagogy.

Amidst days full of medical problems he found time to attend to the cultural aspects of life. While he himself found delight and profit along various avenues of study, such was his broad and generous purpose and impulse that he sought to bring the beautiful, the interesting, the important, to every member of his community. Long years of association with the St. Paul Institute is a marked, but by no means the only, exhibition of his activities outside of his profession. Coupled with his delight in intellectual pursuits was an exceptional ability of expression shown in his many contributions to medicine and particularly in his manner of speech, not only as a conversationalist but as a public speaker. Nicety and clarity of diction supported by a voice of sonorous tone brought delight, pleasure and information upon many subjects to many people and, in the field of debate, conviction.

Dr. Sweeney's whole attitude of life was an intense interest in the problems at hand and a vision of the future ever present, with the result that he never lagged but advanced with his years.

In memory of Dr. Arthur Sweeney, your Committee offers this resolution—

WHEREAS, The Academy of Medicine has lost by death the association of Dr. Arthur Sweeney as a fellow of this society and as a member of the medical profession—

BE IT RESOLVED, That the sentiments herein expressed be spread upon the minutes and a copy forwarded to his family.

(Signed) Harry P. Ritchie,
E. M. Hammes,
Frank E. Burch.

A motion was carried that the election of new members be deferred until the next meeting.

The scientific program of the evening consisted of the following case reports:

Dr. C. B. Wright (Minneapolis) reported a case of acute cholecystitis and acute pancreatitis, as follows:

Mrs. R. S. On Tuesday morning, November 27, 1928, I was called to see this woman. When I arrived, at 10 o'clock, she was in the bathroom. She walked back to bed and told me that she had been having terrific attacks of cramp-like pain in the upper abdomen starting two days before. The pain came on early in the morning and resembled gas pains; it was very severe and was localized in the upper abdomen, mostly to the right of the median line. She had vomited everything the first day and had taken nothing since. On the morning of the day I first saw her the pain had increased markedly in severity. On the first day she had been given a hypodermic of morphin; also on the second day. Although she had been in bed most of the time, she had at times been up and walked around. She had taken a cathartic early this morning and her bowels had moved several times.

Superficial examination revealed a fleshy woman 45

years of age; a generally distended abdomen fairly rigid above the umbilicus, but not board-like; pulse was 120 and regular.

I advised her to go to the hospital immediately and she insisted upon walking down stairs to a car to be taken to the hospital. Upon arriving at the hospital she stepped into a wheel chair and was taken into a ward in the hospital. She apparently was suffering intense pain. After getting her into bed and giving her a quarter grain of morphin, I obtained the following history:

She had always been healthy; had worked as a wash-woman to support five children and an alcoholic husband. Since August, 1928, she had had attacks of cramp-like pain in the upper abdomen which have increased in frequency. These pains would come on while she was at work and would last a few hours. They were very intense in character and would go through her abdomen to her back and shoulders, but they would last only a few hours. However, she had been working most of the time. She stated that she has never been jaundiced.

Upon more careful examination at the hospital we found her blood pressure to be 124/86; rectal temperature 100; heart and lungs clear; pulse 120; respiration rapid, costal in type; no edema. There were burns of the first degree over the upper part of the abdomen, where she said she had applied hot pads. Her abdomen was generally distended. The patient was not in shock. I thought we could make out movable dullness in the flanks. The area of greatest tenderness was to the right of the median line in the gallbladder region, and this was the area of greatest pain, which she claimed went through to her back. There seemed to be a definite line of demarcation of greater rigidity above the umbilicus. Below this the abdomen was distended but not particularly rigid. The rigidity was not board-like. The outline of the spleen and liver, on percussion, was normal. There was no generalized cyanosis. The leukocyte count was 11,900. A specimen of urine was not obtained. The patient was seen by Dr. George Dunn and we decided that she had some severe upper abdominal condition suggesting, more than anything else, a ruptured gallbladder.

Upon operation at 12:30 by Dr. Dunn the abdomen was found to contain considerable dark fluid. There was much fat necrosis in the peritoneum and omentum. The omentum around the stomach seemed friable and hemorrhagic. The gallbladder was distended and very tense. Upon opening it, several gallstones were removed, together with a considerable amount of cloudy fluid. No stones were found in either the cystic or common ducts. The gallbladder was drained and the abdomen closed.

The patient's condition seemed fairly good until the following morning, when she became irrational and vomited. The pulse rapidly increased, became weak and irregular. The patient died at 2:30 p. m. on November 28th, about 26 hours after the operation.

Acute pancreatitis is not a common condition. A person may die within a few hours after an attack, due to hemorrhage or to what is called "shock," or may apparently recover, or may apparently improve and live for several weeks. The points in the diagnosis of acute pancreatitis usually stressed are: (1) the sudden onset of excruciating pain in the upper abdomen radiating all over the abdomen and into the back; (2) pain which requires a grain or two of morphin for relief; (3) profound shock; (4) the presence of a ridge across the upper abdomen with absence of a board-like feeling; (5) vomiting and obstipation; (6) generalized cyanosis (particularly emphasized by Halstead); and (7) extreme tenderness in the upper abdomen in the median line or, more frequently, to the left of the merian line. Fifty per cent of these cases have a history of previous disturbance in the gallbladder region.

In this patient we had evidently two distinct pathologic conditions: (1) acute cholecystitis with marked distention of the gallbladder, and (2) acute hemorrhagic pancreatitis, the exact onset of which is difficult to determine. The striking features of this case are: (1) the total absence of shock; (2) the definite localization of the pain and tenderness over the gallbladder region; and (3) the absence of vomiting after the first day, and the normal action of the bowels after a cathartic and without vomiting.

Moynihan claims that this condition should usually be diagnosed. However, in a patient such as this, it would seem that a diagnosis of "acute pancreatitis" could not be more than a guess. We were not able to obtain a specimen of urine, although she voided once or twice involuntarily. From an extensive review of the methods of diagnosis of pancreatic disease, particularly from a laboratory standpoint, Dr. Robert Coop came to the conclusion that there are no laboratory tests, either blood or urine, which will help us to any extent in diagnosis.

Dr. Paul H. Guttman (Minneapolis), by invitation, gave the autopsy report in this case (A-28-1536): The principal gross findings are as follows: There is a recent right rectus incision measuring 15 cm. in length and containing numerous drains in its upper and lower portions. There is marketd fat necrosis over the omentum and both visceral and parietal peritoneum. There is about 500 c.c. of bloody fluid in the peritoneal cavity. The intestinal surfaces are markedly hyperemic. There is thrombosis of the large branch of the pulmonary artery supplying the right lower lobe with massive infarction of almost the entire lobe. The gallbladder is markedly thickened and of a bluish red color, attached laterally to a rubber tube. There are no stones present. The common duct is about three times the normal diameter. The dilation ends abruptly at the papilla, which is firm and its lumen is markedly constricted. The pancreas shows marked increase in size and areas of fat necrosis and hemorrhage throughout. There is extensive hemorrhagic necrosis throughout the lesser peritoneal cavity and mesocolon. The duct of Wirsung is traced to the common duct, where it ends about 1 cm. from the papilla of Vater. It is not dilated.

Microscopic examination shows acute inflammation

throughout the walls of the gallbladder; fat necrosis; hemorrhagic pancreatitis.

Anatomic diagnoses: (1) acute hemorrhagic pancreatitis; (2) acute cholecystitis; (3) dilation of the common duct; (4) stenosis of the ampulla of Vater; (5) fat necrosis; infarct of lung.

Comment: In this case two factors must be considered in the etiology of the acute hemorrhagic pancreatitis, *i.e.,* the acute cholecystitis and the obstruction of the papilla. Following Opie's work, little evidence had been produced to support his conclusion that the blockage of the bile duct by stone with subsequent conversion of the common duct and the duct of Wirsung into a common channel will cause acute pancreatitis, and the general opinion drifted to the lymphatic route of infection from an infected gallbladder. Experimental and anatomic evidence, however, has failed to support the latter contention. Acute pancreatitis has only been produced experimentally by the injection of bile into the duct of Wirsung. Recent investigation is pointing again to the bile duct route of infection. Noble and Manson have shown that the conversion of the common duct and the duct of Wirsung into a common passage is possible in the majority of cases, contrary to the opinion of Mann and Giordana. Much evidence is accumulating to indicate that under certain conditions there is sufficient pressure in the bile system to force bile up into the duct of Wirsung.

In this case it is difficult to decide which factor is responsible. It appears that the regurgitation of bile into the duct of Wirsung seems more probable, but we cannot entirely rule out infection of the pancreas from the gallbladder by way of the lymphatics.

DISCUSSION

Dr. C. M. Carlaw (Minneapolis): I would like to ask Dr. Wright if the symptoms he first saw in the case were due to the pancreas or the condition of the gallbladder?

Dr. H. T. Nippert (St. Paul): I would like to ask Dr. Wright if he had made a diagnosis of acute pancreatitis, what would have been his treatment?

Dr. Wright: That was the problem we had confronting us: whether this was a case in which the symptoms of acute pancreatitis to a large extent were masked by the acute gallbladder infection. The clinical picture was more like gallbladder disease on account of the location of the pain, the history of previous attack, and the absence of shock. Any one who had seen a large number of these cases would, however, undoubtedly have been attracted by the feeling on palpation of the abdomen, *i.e.,* the transverse line of definite resistance without a board-like rigidity. I remember hearing Dr. Halstead tell us 25 years ago how he would recognize his next case.

In answer to Dr. Nippert's question: If one knew absolutely that a patient had an acute hemorrhagic pancreatitis, with conditions similar to those in this patient's abdomen, one would not advise operation; certainly not in the acute stage. If the patient survived and reached the abscess of cystic stage then operation might be advisable. On the other hand—how can one be sure of his diagnosis without exploring?

Dr. A. Schwyzer (St. Paul): In pancreatitis following cholecystitis, we have two sources to consider. Sometimes we have to accuse the direct communication of the lymphatic of the gallbladder with the head of the pancreas and we very often see a swelling of the head of the pancreas in cholecystitis. In these cases usually the pancreatitis is of a milder form. We very often have a lumpy head of the pancreas, lumps as large as beans or almonds, which are somewhat movable. That is not a dangerous condition. We can close the abdomen up tight and the lumps will disappear. In one case I saw the pancreas stand out like a pyramid. We drained the gallbladder. Two years afterwards the patient had the same condition again, and again she had that very large pancreas which had receded between these two attacks. The second time we took the gallbladder out and she has had no trouble since, which means for a considerable number of years.

The other form is the one where you have infection running back into the ducts. This is more serious. As Dr. Wright said, we can go at the cases of acute pancreatitis if the diagnosis is made early, and it is not so very difficult to make, at least with a good degree of probability. There is enormous distress across the upper abdomen and distention, but the abdomen is not as hard or board-like as in perforated ulcers of the stomach. Then there is early (in the peracute cases) the feeling of collapse and impending death. Dr. Wright mentioned the possibility of injury to the pancreas from handling during his operation. This I do not think we need to consider. The pancreas is very likely to stand considerable handling if not infected. One case I want to mention. A young man riding a bicycle fell and the handle-bar of the bicycle went into the epigastrium. After a stormy initial time he improved. Then he came to me a month after the accident. He had a large swelling in his epigastrium and there was also free fluid in the abdomen. On opening him we found he had a lot of fluid in the abdomen which we had to remove. The fluid was clear. A bulging was seen, with the colon and stomach over it. Then we knew we had a condition in the lesser peritoneal cavity. After emptying the ascites as well as possible, we walled off an area between the colon and stomach. The gauze getting soaked, made walling off of doubtful safety. Through a tiny opening in the gastro-colic omentum a catheter was quickly inserted and about a quart of pus with some old blood was evacuated through this catheter. The pancreas had been crushed. That boy got well without any trouble.

In another case a man who had had no food except water and milk for 5 weeks, as we had thought the condition to be an ulcer of the stomach, threw up a piece of what we had to consider to be sloughy pancreas tissue after microscopic study. About two years afterwards I operated on him for gallstones and then the diagnosis became more definite. He had had a phlegmon of the pancreas with necrosis that broke through into the stomach.

I mention these cases to show that it depends on the virulence of the infection and its acuteness and extent, as to whether or not the patient is going to die. If simple handling of the pancreas were so dangerous we would see more trouble when operating on it, as, for instance, one has to take some pancreas tissue along at times in extensive resections of the stomach.

Dr. E. M. Hammes (St. Paul) reported two cases:

1. A case of Subaraehnoid Hemorrhage associated with Pregnancy. A female, age 41, was seen in consultation with Dr. Hugh Beals, November 30, 1928. The family history was negative. Her personal history was negative except at the age of ten she had a severe attack of typhoid fever. This was complicated by a myositis of the neck muscles with subsequent contractures. These were operated on by the late Dr. Arthur Gillette. She had passed through three normal pregnancies. This last pregnancy had been normal throughout without any evidence of nephritis, and there was a normal blood pressure. On the way to the hospital on November 26, 1928, she was delivered in the automobile. She stated that she had practically no labor pains. Three days later she complained of pain and rigidity of the neck muscles. She states that this pain was similar in character to the one when she had the myositis 31 years ago. This gradually became more pronounced and along with it she became somewhat flighty and talkative. Her temperature varied between normal and 100.4; pulse 110. On the afternoon of the fifth day her pulse suddenly became very rapid (160), without any increase of her other symptoms. An examination at 9 p. m. revealed the following:

The patient was somewhat flighty and had difficulty in concentrating. She had marked rigidity of the neck and a positive Kernig. Her eyes were restless and jerky. All reflexes, sensation, fundi, and so forth, were normal. Temperature was 100.6; pulse 120. My first impression was a tubercuIous meningitis. A lumbar puncture was performed and we had some difficulty in inserting the needle. The spinal fluid was uniformly bloody. About 20 c.c. were removed under somewhat increased pressure. There was some relief of her symptoms. The following morning Dr. Beals performed another lumbar puncture, removing 30 c.c. of bloody spinal fluid. The patient's condition gradually grew worse and she died three days later.

A postmortem was performed. All findings were negative except for a marked hemorrhagic exudate over the entire brain extending into the spinal canal. Careful search of the cerebral blood vessels revealed no evidence of a ruptured blood vessel or an aneurysm. Further microscopic studies of the brain are being made. However, in the absence of any ruptured cerebral blood vessel or aneurysm, one is probably dealing with a case of spontaneous subarachnoid hemorrhage. The pathology of this condition is primarily in relation to the cerebral venous circulation with perivascular exudates around the veins.

This is the second case of this kind I have encountered closely associated with pregnancy, with normal blood pressure. It would be of interest to hear from the obstetricians whether this condition is more common than one suspects.

DISCUSSION

Dr. F. L. Adair (Minneapolis): Was there any toxemia associated with this?

Dr. Hammes: None whatsoever.

Dr. Adair: You can have hemorrhages in various portions of the body following delivery but I have never seen one of this kind cause serious damage. You get subconjunctival hemorrhage and emphysema from rupture of the lung, and I suppose it is quite possible to get an intracranial hemorrhage though I have never seen one except in association with convulsive toxemias.

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2. The second case was a primary hemangioma of the mid-dorsal vertebræ with an associated transverse myelitis. The patient was operated on by Dr. Wallace Cole and made recovery. Full details of this case will be published later.

DISCUSSION

Dr. A. Schwyzer: It would be interesting to know more about the pathology of this case. It had been declared malignant, but ordinary hemangiomas are not malignant and they respond very well to radium. I would imagine it would be well to try *x*-ray and radium here. In one case where we had a malignant growth in a dorsal vertebra, causing paralysis, we went into the vertebra and put 50 mg. of radium rather near the cord (about 2/3 of an inch or an inch away). We rather recklessly left that in for 48 hours, knowing that of all tissues the nervous tissue is least damaged by *x*-ray and radium. That woman did not have any damage from it. On the contrary, the paralysis improved. She walked again a little after a while, but she died of her malignancy. In that case there was no damage done by 48 hours of 50 mg. in very close proximity to the cord.

Dr. A. Schwyzer (St. Paul) reported the following case: Two weeks ago today I had a case of carcinoma of the lesser curvature of the stomach. The patient was very anemic. We transfused her and did a modification of the Polya operation. (Diagram on blackboard.) It is on account of the modification which I have now done several times that I mention the case. I think it is worth while. We had to go far up on the lesser curvature of the stomach. (Shown on diagram.) The upper two-thirds of the wound on the stomach were sewed up and inverted. On the lesser curvature inversion was somewhat under tension. We then sewed the gut to the whole length of the original stomach wound posteriorly. The suture started at the lesser curvature and reached the greater curvature, where it was left long. We then cut a hole into the gut corresponding to the stomach opening and closed this anastomosis by two sutures. Then the thread of the first posterior suture was continued from the greater curvature up to the point or origin on the lesser

curvature. I think this modification will sometimes be welcome, when there is some fear for the suture far up. The gut then insures the suture, insures a free outlet, and a not too free inlet from the upper loop of jejunum.

Dr. Carl B. Drake (St. Paul) reported a case of coronary thrombosis, as follows:

The following case of coronary thrombosis is presented because of the fact that the patient was only 40 years of age, had never had a previously recognized anginal attack, and had had such a variety of previous illnesses as to confuse the picture.

I saw the patient at 3 a. m. November 28, 1928, when he was suffering from an agonizing pain in the pit of the stomach. The patient was in such evident agony, as evidenced by pallor, profuse sweating, and his statement that he was dying, that a hypo of morphin gr. ¼ and atropin gr. 1/75 was given at once. No relief being obtained, the ¼ grain of morphin was repeated in about ten minutes.

The pain was located in the epigastrium just below the ensiform and did not radiate up into the neck, shoulders, or arms, nor through to the back. There had been no vomiting or disturbance of the bowels and there was no increased abdominal resistance. There was some epigastric tenderness and the gallbladder region was slightly tender. There was no tenderness in the region of the appendix or kidneys. The heart rate was 100, regular, and no murmurs were heard. The radial arteries were markedly sclerosed and tortuous.

My impression was that I was dealing with a gallbladder colic, although the marked radial thickening suggested the possibility of a coronary or mesenteric thrombosis. The patient's age was rather against a thrombosis. When the second hypo failed to give relief, fearing I might be overlooking a surgical condition such as an ulcer which had perforated into the lesser peritoneal cavity or a volvulus, and upon the suggestion of the family, I called Dr. Hammond. By the time he arrived the pain was much relieved although the tenderness and epigastric discomfort persisted. Vomiting occurred several times before the patient reached the hospital at noon.

The following history was elicited:

In 1918 a moderate sized kidney stone had been passed from the left kidney. Nocturia three or four times each night had persisted since.

In 1919 the patient had had several pulmonary hemorrhages varying in amount from a teaspoonful to a cup, and he was told he had tuberculosis.

In 1921 he had the symptoms of and was diagnosed appendicitis, but was not operated upon. Again last December he had pain and tenderness in the lower right quadrant but recovered on an orange juice diet.

He stated he had had pleurisy in the winter of 1925 and again in 1926 and had suffered from hay fever and asthma each year. He had never been jaundiced.

While in the hospital the patient was extremely nervous, especially at night, and continually wanted to go home. Aside from some epigastric distress and occasional spells of coughing he had no symptoms. His pulse varied from 88 to 110. His temperature was normal the first day in the hospital, then ran as high as 101.4°, being usually normal each morning. His blood pressure was 168/118 on admission.

The heart was percussed 10.5 cm. to the left; the heart tones were regular, and no murmurs nor frictions were ever heard.

Numerous râles were heard at one or both lung bases at times. The apices were clear. Blood-tinged sputum was raised, but four specimens failed to show any tubercle bacilli.

A tender spot the size of a dollar was located just below the ensiform process, which also was the location of the discomfort and previous pain. The gallbladder area was a little tender. The kidneys were not palpable, nor were the kidney or appendix regions tender.

The urine contained 10 to 15 r. b. c. and the same number of pus cells and a trace of albumin at times. No bile was found. There was a leukocytosis of 23,000 upon admission. *X*-ray of the genito-urinary tract showed only calcified arteries in the region of the lower ureters.

The patient at his own request left the hospital Dec. 5th, after a week in bed.

He was seen at home on the morning of Dec. 7th and, aside from râles at both lung bases, pulse 100 and a rather poor muscular quality to the heart tones, nothing was found. At 4:30 in the afternoon I was called in a hurry on account of a choking spell. He was comfortable when I arrived at 5 p. m.

Up to this time I must confess I was inclined to the diagnosis of a kidney stone on account of the blood cells in the urine, the history, and severe colic. When the choking spells appeared, the picture was clear and his wife was told of the seriousness of the situation.

The patient died at 2:30 a. m. (December 8th), just ten days after the occurrence of the thrombus.

Autopsy by Dr. Kano Ikeda showed in brief the following:

The descending branch of the left coronary artery was completely thrombosed and a large infarct involved the wall of the left ventricle. The inner portion of the ventricular wall showed a marked, recent degeneration of the heart muscle. There was an excess of slightly cloudy fluid in the pericardial sac. There was a small thrombus in the tip of the left ventricular chamber.

There was a generalized edema of both lungs and two calcified tuberculous nodules 0.5 cm. in diameter were found in the lower portion of the upper right lobe with adherent pleura in that region.

There were scattered calcified miliary tubercles throughout the spleen. A few healed tubercles were visible on the surface of the liver. The gallbladder was normal.

The left kidney was about half the normal size. No calculi were found. Both ureters were slightly dilated.

The appendix was firmly bound down in the pelvis.

There was a marked generalized arteriosclerosis involving coronaries, aorta, renal and popliteal arteries.

This is the fifth case of coronary thrombosis I have

seen in the past four years. The first one developed a pericardial friction, the second a hemiplegia, the third (a woman suffering from diabetes) recovered, and the fourth died in about two weeks after the onset. These patients were all elderly and all but one died.

An electrocardiogram often gives in this condition very definite information and is of distinct diagnostic value.

It has been proven conclusively that patients with coronary thrombosis do recover but are likely to succumb in a subsequent attack. The arteriosclerosis is, of course, the predisposing cause and it is progressive.

DISCUSSION

Dr. J. F. Hammond (St. Paul): When I saw this man I thought he was having a gallbladder attack. The question of the pancreas came up, and also perforated ulcer, but I thought those could be ruled out. When I advised (also Dr. Drake advised) him to go to the hospital for observation I told his family I thought it was a gallbladder attack. When he got to the hospital he was feeling better, but he was rather anxious to be operated on that day. The next I heard about him, pus and blood cells were reported in the urine. Then I thought I was wrong again, and decided the trouble might be in the kidney. Dr. Drake kept telling me about the arteriosclerosis but I was not much impressed. I did not see much of the patient in the hospital. The next I heard about him he had gone home, and then a little later that he was dead.

Dr. A. R. Hall (St. Paul): I think there are a few points that help out in the diagnosis of these coronary cases which are so confusing. These patients have fever in a very short time after the attacks of pain; they have a slight leukocytosis shortly after and then a marked leukocytosis, which might well be confusing. Then one is often struck by the appearance of the patients. They look a little different than patients with other acute pain. They have an ashy gray appearance, different than we see in gallbladder attacks and in the perforations. I think that peculiar color is very frequently present. Then the pain is very often located in the upper abdomen. I have had the experience of diagnosing gallbladder, and coming to the correct diagnosis through the failure of relieving the pain with moderate doses of morphin. I think that is the rule; they often cannot be relieved at all with morphin. The thing that always struck me in these cases is the very marked systemic reaction to so small a lesion. I have seen them go on to death with a very small area of necrosis or softening and yet with most marked systemic reactions. Practically all have fever, and practically all have marked leukocytosis. A leukocytosis usually means a bacterial infection. These are not bacterial infections and I do not know why they get such a marked general reaction as they do. It is not a rare condition at all and it is a condition in which a patient's life may often be saved by keeping him from being operated on. If the added strain of an operation were put on the patient he might easily succumb. Quite a goodly number recover from these attacks and go on for a number of years. Personally I can recall two men who had attacks at least three years back. One I think is quite well today.

Dr. C. B. Wright (Minneapolis): It is interesting to know just how little circulation you may get through the coronary before there are marked symptoms. I saw Dr. Bell perform an autopsy on a compensation case not long ago. The patient had been seen by a good internist shortly before his death, who had pronounced his heart normal. At postmortem the descending branch of the left coronary artery was so small a pin could hardly have been introduced. The opening was so small that the embalming fluid had only slightly invaded the left ventricle, while the right ventricle was very well permeated. It undoubtedly is the sudden stopping of the circulation which produces the acute symptoms. I would like to ask Dr. Drake if there were any sudden changes in blood pressure noted or anything in the heart tones to suggest a cardiac origin for the pain. The appearance of the heart suggests a long-standing hypertension which would explain the coronary sclerosis.

Dr. Drake (St. Paul): The findings, on examination of the heart, were almost entirely without indications of anything wrong with the heart. That was one of the reasons why I was so slow in coming to the diagnosis. There were never any murmurs, no irregular rhythm, no abnormal accentuation, no friction; but there was something about the heart tones that gave me the impression of their not being of good muscular quality. The blood pressure was 168/115. Unfortunately, it was taken just once. The blood pressure is reported to become progressively lower in these cases. We should have had an electrocardiogram on this patient but it was not obtained for financial reasons. Probably it would have given us very definite information which would have aided in the diagnosis.

Question: Was a Wassermann taken?

Dr. Drake: A Wassermann was not done. Syphilis is not an etiological factor in this condition.

Dr. Hall: Did he have a previous history of hypertension?

Dr. Drake: He had been told that he had high blood pressure.

Dr. H. B. Sweetser (Minneapolis): Is it not unusual to have this condition in so young a person, and, if so, what is the etiology of it.

Dr. Drake: The four cases I have seen previously were in elderly individuals; one was a female, and all died except the woman, who was a diabetic. This man was only 40 years old. I do not know what the etiology of arteriosclerosis is. Three of these men I have seen have been inveterate cigarette smokers; the woman was not. Tobacco and nicotin have been described as etiologic factors of arteriosclerosis, especially in Polish Jews. Smoking has not been found to be a causative factor in the cases reported.

Dr. Sweetser: Had he been in the army?

Dr. Drake: Yes, he had been in the army. He had been in the Veterans' Hospital two or three years ago for nervous breakdown.

Dr. Wright: This man had hypertension?

Dr. Drake: He said he had been told he had hypertension.

Dr. Wright: What would cause the hypertension?

Dr. Drake: The cause of hypertension is as obscure as the cause of arteriosclerosis. The two conditions need not accompany each other. That is, there may be a marked generalized arteriosclerosis without hypertension. Also arteriosclerosis need not be generalized but sclerosis of the coronaries, according to reports, always is associated with and is the cause of coronary thrombosis.

Dr. F. L. Adair (Minneapolis) reported the following case:

P. I., age 33; grav. III, para. II. White.

The patient was admitted to the hospital November 29, 1928, at 9:30 a. m., complaining of painless bleeding and pregnancy at term. She began to have painless bleeding six weeks previous to entrance. This occurred at intervals of eight to 10 days, and was slight in amount. A 2 a. m. on the day of entrance the bleeding became very profuse and continued so. She was seen by an outside physician and sent into the hospital with the diagnosis of placenta previa.

Family history negative. She had measles and chickenpox in childhood. No operations. Menses were established at the age of 13, regular at intervals of four weeks, four days' duration and not painful. The last period was February 10, 1928. There were two previous pregnancies normal in character, full term, and resulting in spontaneous deliveries. A manual removal of the placenta was done at the last labor in 1926.

The present pregnancy was uneventful until the third trimester when the patient began to have the bleeding. Physical examination on entrance showed a well-developed, fairly well-nourished white female, very pale and anemic in appearance. Blood pressure 120/70, pulse 110, temperature normal. Heart and lungs normal findings. Abdominal examination revealed breech in fundus, fetal back on the right, small parts on the left, and head floating at the pelvic brim. Fetal heart rate was 160, best heard in the right lower quadrant. On rectal examination no presenting part was palpable and no dilatation or effacement of the cervix was found.

Pelvic measurements: Interspinous 26 cm., intercristal 28, intertrochanteric 30.5 cm., external conjugate 20.5 cm.

Laboratory data: Urine showed a faint trace of albumin, 5-8 red blood cells, and 5-6 pus cells. Hemoglobin 44 per cent.

The patient was seen in consultation by the staff at 11 a. m. and it was decided to induce labor with small doses of pituitrin. Pituitrin M iii was given at 11:30 a. m. At 11:45 the patient was having uterine contractions, was perspiring profusely and seemed to be going into shock. Her face was very cyanotic, pulse at radial artery was not perceptible. and blood pressure 40 systolic. Adrenalin M v, and caffein sodium benzoate gr. x, were given. At 11:55 the patient had a convulsion lasting 3 minutes. She recovered somewhat and in a few minutes had a second convulsion of ten minutes' duration. Convulsions were clonic in type, beginning in the arms and then occurring in the legs. The patient became very cyanotic, had stertorous breathing, frothed at the mouth, bit her tongue and became unconscious. Chloral hydrate gr. 40 and sodium bromide gr. 30 were given per rectum. The patient regained consciousness and the blood pressure rose to 90 systolic. Pulse became stronger but was very rapid. She continued to have labor pains at 5- to 8-minute intervals. At 1:45 p. m. a vaginal examination was done. The vagina was found to be full of old blood clots, cervix was 90 per cent effaced and the external os 7 cm. dilated. The head was presenting, station above the spines, and position right occiput posterior. The patient was put on the delivery table. She continued to have pains and was very restless as one in labor. The fetal heart was not heard at this time. Vaginal bleeding was moderate in amount. At 2:15 p. m. the condition of the patient suddenly became critical, pulse was imperceptible, lips cyanotic, pupils dilated, face very pale and extremities cold. She was prepared for delivery. An application of forceps was unsuccessful so a version and breech extraction was done by the resident obstetrician. Delivery was easily and rapidly performed. The infant was stillborn. A large amount of dark blood was passed. The placenta was removed manually. The condition of the patient was critical at this time. Death occurred at 2:30 p. m., fifteen minutes following delivery.

Abstract of Autopsy Report: Autopsy was done about 2 hours postmortem. The main findings were old fibrous pleural adhesions; the heart weighed 320 grams, muscles of a light brown color and very flabby; valves and coronaries were normal; the root of the aorta was normal. The left lung weighed 260 grams and the right 265 grams. Crepitation was present throughout. The spleen weighed 165 grams. The follicles were distinct and the pulp was normal. The liver weight 1,795 grams and was rather pale, showed no hemorrhages or areas of necrosis. The gastrointestinal tract, pancreas, and adrenals were normal. The combined kidney weight was 280 grams. The cortex was slightly increased in thickness. The medulla was distinct and of a darker red color. The normal cortical markings were lost. The kidney pelves, ureters, and bladder were normal. The uterus weighed 180 grams and was rather pale. There was very slight laceration on the posterior lip of the cervix. The musculature was of good consistency. The uterine cavity was free of blood. The site of placental attachment was low on the anterior wall.

The pathological diagnoses were:

1. Postpartum uterus
2. Placenta previa
3. Nephrosis
4. Bronchopneumonia

Microscopic findings: Liver was normal. Kidneys—nephrosis. The lungs showed scattered areas of bronchopneumonia. Appendix and pancreas and spleen normal. Uterus section shows some areas of hemorrhage and numerous collections of polymorphonuclear cells.

DISCUSSION

Dr. Adair: The relation of the pituitrin to this is

problematical. The urine showed only a faint trace of albumin, but nothing else. The blood pressure was very much below normal. It has been stated that we sometimes do have symptoms with pituitrin but with a small dose of 3 min. it hardly seems possible. I have given pituitrin hundreds of times and never have seen anything like this.

DR. H. T. NIPPERT (St. Paul): I can't see how 3 min. of pituitrin could cause anything of that kind.

DR. MCCLOUD: What would you ascribe as the cause of death in that case?

DR. ADAIR: I don't know; it looked like a case of eclampsia.

DR. C. M. CARLAW (Minneapolis): Was there any muscular paralysis?

DR. ADAIR: There was no paralysis at all.

DR. F. W. SCHLUTZ (Minneapolis): At a a recent pathological conference Dr. Wangenstein reported some experimental results with pituitrin and its effect upon blood pressure in surgical abdominal procedures. Any rapid fall in blood pressure resulting from sudden release of intra-abdominal pressure or tension could be counteracted by the injection of pituitrin. Both clinical and experimental experience showed that pituitrin uniformly had that effect. These results would tend to prove that the administration of pituitrin could hardly have been a contributing factor in bringing about the sudden fatal termination of Dr. Adair's case.

DR. NIPPERT: Do you think it was just a case of shock?

DR. ADAIR: It would be difficult to account for the convulsions on that basis. There was no sign of embolism—either air, or any other kind.

The meeting adjourned.

CARL B. DRAKE, M.D.
Secretary.

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THE TREATMENT OF ACUTE EPIDEMIC ENCEPHALITIS*

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EPIDEMIC encephalitis as a separate entity is of recent origin. A glance through the history[1] of the epidemics of the medieval times leads one to believe that such conditions as "sweating sickness," etc., belonged to this syndrome. Unfortunately, the rarity of the disease and its intractability have made it poor subject matter from the standpoint of therapeutics.

Since 1918, in the United States and in Europe,[3] the number of cases[2] has reached epidemic proportions possibly only twice, with the result that the acute condition has not been seen in numerous enough instances to allow a searching and detailed investigation from the standpoint of clinical and experimental evidence. Neal,[4] thinks that the etiology may be related to toxins from metabolic disturbances of other infectious diseases, while Zinsser[5, 59] feels that a filtrable virus is at fault and the effects are allergic or similar to those of a lead encephalitis. Rosenow[6] has much evidence to show the relation of a virus, streptococcic in origin.[9]

Epidemic encephalitis is diagnosed[7, 8] almost entirely by exclusion of other syndromes[43] involving the central nervous system. The difficulties of diagnosis are increased by the variation of the symptoms in different phases of the disease. The clinical behavior is quite different during epidemics from that of sporadic cases or recurrent cases. Briefly, the conditions from which it must be distinguished are botulism, brain tumor, brain abscess, miliary tuberculosis, anterior poliomyelitis, cerebro-spinal syphilis, drug poisoning, such as luminal, veronal (especially in old people), methyl alcohol and choral; finally, malaria, uremia and hysteria.

These various conditions are referred to briefly. So similar is botulism[10] to encephalitis that during the earlier months of the epidemic in England in 1918, it was referred to as botulism. Botulism has a history of the ingestion of spoiled food. The spinal fluid is milky in character, containing large bacilli and as many as 2,000 polymorphonuclears. The condition usually involves a large number of people in the same group or family, whereas in epidemic encephalitis two cases in the same family are rare—several having been reported in the French literature, one occurring in my own experience.

Brain tumor and brain abscess may present cardinal symptoms of an epidemic encephalitis. The usual points of differentiation are the localizing or focal symptoms, together with the spinal fluid findings such as increased pressure and cell count. The presence of a choked disc is the most significant factor in the diagnosis of a brain tumor, as it rarely occurs in epidemic encephalitis. A brain abscess must always be thought of where there is a history of either an otogenic, pulmonic or traumatic head infection.

The difficulties of diagnosis are best illustrated by a case with seventh nerve palsies, lethargy and many symptoms typical of epidemic encephalitis. The spinal fluid had an increased globulin cell count. At autopsy it proved to be a carcinoma of the prostate with metastases, so situated as to involve cranial nerves, substantia nigra and lenticular nucleus in a manner suitable to the simulation of the well-known encephalitis syndrome.

The differentiation between epidemic encephalitis and acute anterior poliomeyelitis[11, 13, 14, 15] is practically impossible in a microscopic examination of the tissues.[12] It will be seen therefore how difficult the clinical differentiation is. Poliomyelitis occurs largely in epidemics

*From the Medical Department, Creighton University. Presented before the Southern Minnesota Medical Association, Rochester, Minn., Oct. 3, 1928.

during the summer. Numerous cases will be found in one family. The spinal[16] fluid in its early stages always contains an increased number of polymorphonuclears, together with other signs of an acute infection. Palsies are more permanent,[17] and usually involve single muscles or muscle groups of the extremities. It is more largely a disease of infancy and early childhood.

Epidemic encephalitis,[18] in contra-distinction, occurs more often in adults, usually in the winter time, and in conjunction with involvement of the upper respiratory tract. It is usually accompanied by involvement of some of the cranial nerves. It practically never results in a permanent or lasting paralysis, although fleeting paralyses are not uncommon.[19, 20, 21, 22] It is rarely seen affecting two members of the same family. Amoss[23] was able to produce poliomyelitis in a monkey by means of infected nerve tissue from human beings, but was not able to produce it from their spinal fluid. On the other hand, over 75 per cent of animals injected with the spinal fluid of encephalitic patients came down with the encephalitis. In addition, serum from patients convalescent from poliomyelitis protected his animals from poliomyelitis. It was also shown by Levaditi and Harvier[24] that animals recovered from poliomyelitis are susceptible to epidemic encephalitis,[25] while animals recovered from epidemic encephalitis seem to have acquired an immunity to anterior poliomyelitis.

The condition which offers the greatest difficulty and is of the gravest importance is cerebro-spinal lues.[10] It has been our experience that a positive Wassermann reaction of the spinal fluid can be most deceptive. A series of cases of epidemic encephalitis, which we have been able to study over a definite period of time, exhibiting a positive Wassermann reaction in spinal fluids, is probably illustrative of the caution that must be exercised in the differentiation between these two important diseases. Syphilis of the central nervous system can present a typical cranial nerve palsy, the increased cell count and an increased globulin, the usual luetic gold chloride curve and a positive Wassermann. Fever, lethargy and insomnia, restlessness, dilirium and ptosis are usual symptoms of both syphilis and encephalitis.

The first case, a young woman aged 32, when first seen complained of photophobia, blurred vision, muscle twitching and a cold in the head. This was accompanied by convulsive seizures and muscle spasms several times a day. She was troubled with insomnia and extreme hyperacusis. The deep reflexes varied from day to day. The first spinal fluid, Feb. 20, 1922, contained six cells, a positive globulin, with a negative Wassermann and gold chloride 0-0-1-1-1-0-0-0-0-0. March 16 we have a similar report, except that the gold chloride was 1-1-1-1-0-0-0-0-0-0. April 24 the globulin was three plus, Wassermann was negative, and the gold chloride 0-0-1-1-0-0-0-0-0-0. July 16 the globulin was two plus, Wassermann four plus, gold chloride 3-2-1-1-1-1-1-0-0-0. September 7 the globulin was one plus, Wassermann negative, gold chloride 1-1-1-1-0-0-0-0-0-0. After an acute course of nearly two years the patient has made almost a complete recovery, except possibly for lack of confidence in herself.

The second case, a young woman aged 39, complained of occipital headaches, dyspnea, sweating of the hands, crying spells, blurring of vision, insomnia, vertical and horizontal nystagmus, and disturbance of all the deep reflexes. The blood Wassermann was negative. There were three cells in the spinal fluid, plus one globulin and three plus Wassermann, with a gold chloride of 0-0-0-1-1-1-1-0-0-0. This patient had completely recovered within five months, and so far as we know has remained well until the present time.

L. K., aged 25, was seen August 3, 1922, complaining of nervousness and palpitation. This was accompanied by twitching of the muscles, blurring of vision and diplopia, headache, insomnia and thirst. Myoclonic movements and a diaphragmatic tic were most serious. There was also present a horizontal nystagmus. August 6, the blood Wassermann was negative. The spinal fluid showed two cells, two plus globulin and four plus Wassermann. The gold chloride was 1-1-1-1-0-0-0-0-0-0. August 31 the globulin was plus one, three cells, Wassermann negative. October 4, the spinal fluid Wassermann was negative, and the gold chloride was 1-1-1-1-0-0-0-0-0-0. The patient had one .4 gram of neosalvarsan intraveneously and no other antiluetic treatment. She has made almost a complete recovery except for some residual bladder disturbance.

M. H., twenty years of age, was seen in 1920. Her chief complaints were twitching of the right eye, right sided occipital headache accompanied by photophobia, insomnia and extreme restlessness. The deep reflexes were disturbed and the right lower facial nerve was paralyzed. The knee jerks were absent. There was a bilateral clonus and a Kernig sign. The blood Wassermann was three plus. The spinal fluid contained three cells. The spinal fluid Wassermann was negative and the globulin negative. The gold chloride was 0-1-2-2-3-0-0-0-0-0. This patient was ill about two and a half weeks, became cyanotic and died quite suddenly.

The fifth case, M. C., aged 42, complained of vomiting. Because of her vomiting she had undergone varied medical and surgical treatment, consisting of appendectomy and oöphorectomy in the previous three months. The chief symptoms were headache, vertigo,

double vision, marked nystagmus to the left, general retardation of all reflexes, marked ataxia. The patient walked in a circle to the left and showed a tendency to fall in that direction. The blood Wassermann February 7 was negative. The spinal fluid showed four cells, globulin three plus, spinal fluid Wassermann four plus, gold chloride 0-4-5-5-5-4-5-5-4-3. February 9, two days later, the spinal fluid contained four cells, globulin three plus, the spinal fluid Wassermann was three plus, and the gold chloride curve was 0-1-1-2-3-4-5-3-1-0. The patient was put on vigorous anti-syphilitic treatment during the few days that she remained alive. Ataxia, stupor, and incoördination increased, and the patient died two months and a half after she was first seen. An autopsy performed one hour after death showed an absence of pathological changes except in the central nervous system. The left hemisphere of the cerebellum showed the dentate nucleus of grayish pink color, and bulging of the cut surface. There was no evidence of lues or tuberculosis. The "cuffing," minute hemorrhages and perivascular infiltration in the mid-brain and cerebellum completed the picture of epidemic encephalitis.

TABLE I

Patient	Date	Blood Wass.	Cells	Globulin	Wass.	Glucose	Gold Chloride
(1) E. P.	2-20	Neg.	6	Plus 1	0	.068%	0-0-1-1-1-0-0-0-0-0
	3-16		3	Plus 1	0	.050%	1-1-1-1-0-0-0-0-0-0
	4-24		3	Plus 3	0	.049%	0-0-1-1-0-0-0-0-0-0
	7-16		0	Plus 2	Plus 4	.060%	3-2-1-1-1-1-1-0-0-0
	9-7		3	Plus 1	0	.060%	1-1-1-1-0-0-0-0-0-0
(2) C. J.	7-2	0	3	Plus 1	Plus 3	.050%	0-0-1-1-1-1-1-0-0-0
(3) L. K.	8-6	0	2	Plus 2	Plus 4	.060%	1-1-1-1-0-0-0-0-0-0
	8-31		3	Plus 1	0		0-0-0-0-0-0-0-0-0-0
	10-4		?	?	0		1-1-1-1-0-0-0-0-0-0
(4) M. H.	1-10	Plus 3	3	0	0		0-1-2-2-3-0-0-0-0-0
(5) M. C.	2-7	0	4	Plus 3	Plus 4		0-4-5-5-5-4-5-5-4-3
	2-9		4	Plus 3	Plus 3		0-1-1-2-3-4-5-3-1-0

The Wassermann reactions in five cases of Epidemic Encephalitis

The Wassermann, either in the blood or in the spinal fluid, can assume any particular form,[35] especially in the condition as acute as an epidemic encephalitis. Several authorities, such as Strauss and Globus,[7] Suchat,[26] Crampton,[27] report the following: Six positive Wassermanns out of thirty-two spinal fluids. Eskuchen,[28] an occasional positive Wassermann in sixty-two spinal fluids of fifty-three cases. The therapeutic test is probably the best means for final differentiation between the two conditions.

Practically all authorities agree on a syndrome which is typical of encephalitis. This may be summarized[29] under fever, diplopia, lethargy, insomnia, delirium, ptosis. The diagnosis often escapes us because of our failure to obtain detailed histories. Diplopia, cranial nerve palsies, together with disturbances of the extremities or the sphincters, are often of such short duration that careful examination is necessary to bring out the fact that they have existed in the earlier stages of the disease. One case with a diplopia which had existed for three days lost it while I was examining him. Double vision is present in a large majority of cases, and at least a history of blurring will be given by the patient if he is closely questioned. The escape of saliva from the angle of the mouth, the biting of the cheek, the weakness of an extremity will be mentioned by the patient, and to the experienced observer means a passing palsy of an epidemic encephalitis. Neal Jackson and Applebaum[30] feel that the condition is missed many times because a physician is looking for lethargy, insomnia and cranial nerve palsy in every case. Lethargic encephalitis, the synonym for epidemic encephalitis, has been a misnomer to the

extent that lethargy or extreme stupor was necessary to the completion of the syndrome. Many cases, however, will present extreme restlessness and insomnia in the earlier stages. It is only as they are overcome by the progress of the disease that the lethargy appears.

The innumerable syndromes that the condition presents add to the confusion in diagnosis. The efforts made by various authorities[17] to classify types of encephalitis have all resulted in failure. The greatest difficulty that we have experienced in diagnosis is that we have not followed the dictum of our beloved teacher, Theodore Janeway, *i.e.,* merely to observe the symptoms and signs as they present themselves. To summarize the above outline of diagnosis of epidermic encephalitis, the best plan for a physician to follow in a syndrome pointing to involvement of the central nervous system would be to stand back and observe the case from a distance for the purpose of getting a proper point of view. Too close application to a detailed study of each symptom obstructs the true picture and blinds the observer to a syndrome which is as typical as epidemic encephalitis.

The treatment of the condition, then, after the first therapeutic requisition, diagnosis, has been satisfied, falls under two heads: (1) dealing with the earlier weeks of the disease; and (2) with the so-called more settled form and later complications. The scope of this discussion is limited to the treatment of the acute forms. It is to be remembered, however, that during the first one or two years, the fire which seems to smolder, or to all intents and purposes to be completely out, may flare without any known reason and require just as strenuous measures in its treatment as the condition did in its earlier days; in fact, it is almost universally agreed that the co-called complications of the later stages are reinfections accompanied by invasions of other parts of the brain stem. Rosenow[6] so states in Mayo Clinics, 1927.

Treatment[7] may be classed under drugs[68, 69, 72] mechanical and immunological.[61, 62, 64, 65] Drugs are useful for the symptoms. Sodium salicylate[56, 39] with glucose[31, 38] and urotropin[32] may be used intravenously, per rectum, or by mouth.[73] Various authors present results following sodium salicylate[41] therapy, which do not impress one with any degree of permanency or efficacy. Neutral acriflavine[33, 40, 74] and mercurochrome intravenously, potassium permanganate[36] and mercury[37] have been widely advocated. Many advise the use of sterilized milk[34, 60] intramuscularly.

Under mechanical measures, repeated lumbar puncture is most often mentioned, and judging from the various results the most effective. Kubie[42] advises forced fluids and repeated punctures. The removal of infections,[57, 58] the production of sterile abscesses,[77] repeated cleansing[78] of the upper respiratory tract, rest in bed, hospitalization, isolation are among the methods more commonly reported.

Immunological[67]—the most popular preparations are the autogenous vaccine[44, 46, 49] made from nasal washings; convalescent serum[45, 50] for intravenous use[70]; the Rosenow serum[47, 48]; and the use of spinal fluid[52, 53] of the patient for reinoculation into the vein of the patient. Inoculation with malaria has resulted unfavorably.[51]

Hiccough[54, 66, 76] is one of the symptoms which seem to have attracted the most attention, especially after Boyd's[21] excellent work in Winnipeg, where an epidemic in hiccough preceded the epidemic of encephalitis by about a year. We are all familiar with sporadic cases of hiccough, particularly in the younger individuals, which are quite persistent and seem to have no relation to the usual gastro-intestinal type of hiccough. Possibly the most effective measures used to combat this have been the subcutaneous use of ether according to Gibson[63] of New York; the repeated doses of luminal, lavage, the use of Hoffman's anodyne, morphine, lumbar puncture, dilation of the rectum, applications to the epigastrium, even freezing of the phrenic nerve as mentioned by Dowman.[80] They all seem to be effective in different cases. Cases may be severe enough, however, to require chloroform.

The insomnia is most intractable to the ordinary soporifics and occasionally morphine is necessary to control it. Lumbar puncture is the most effective remedy.

All eye symptoms, such as diplopia and ptosis, demand little from the standpoint of symptomatic care. The abdominal and bladder crises can be quite annoying, but will respond as a rule to bladder irrigations and the use of opium.

A definite procedure is desirable in the handling of these cases: (1) Absolute rest in bed

with complete isolation from all outside stimuli; (2) symptomatic relief; (3) lumbar puncture, repetition of which depends on the spinal fluid pressure at the time of the puncture and the relief obtained therefrom. This, in my hands, has probably afforded more constant and effective comfort than any other one procedure. It is usually carried out when the patient is first seen for the purpose of completing the diagnosis. The spinal fluid is allowed to escape slowly until the flow is practically a minimum, stopping from time to time to check up on the pulse, and to inquire of the patient, if conscious, as to the presence of a headache. Very often the complaint of a flat feeling on the top of the head is sufficient indication for stopping the drainage.

The recognition of the comatose or irrational state of the patient is an important factor in handling an acute epidemic encephalitis, especially in the stage of insomnia. The demands of the patient, which on their face seem to be most rational, excite the sympathy and intense interest of relatives and nurses. Frequently patients in this series upon recovery had no recollection of their condition during the earlier weeks or even months of their sickness, although they may have seemed quite rational while passing through this period.

From a diagnostic standpoint, repeated detailed examinations of the reflexes are of value. Frequently it is impossible to demonstrate certain pathological reflexes which were present twenty-four hours before. The constant change of reflexes is pathognomonic of epidemic encephalitis.

It might be wise to emphasize the necessity of protecting the patient from all outside stimuli. This is particularly true if the patient is suffering from insomnia and restlessness. This insomnia can probably be explained by the fact that the brain centers permit sleep when outside stimuli are removed, or when, according to physiologists, the neurological connections have been separated, or at least dulled. It is easy to conceive of these endings being so involved, irritated or disturbed by the perivascular infiltration, hyperemia, etc., that they are highly irritable to what, under normal and ordinary conditions, would not be considered as a stimulus. Hearing becomes enormously exaggerated, and is the main factor in preventing sleep and quiet. Several examples of this hypersensitiveness will illustrate this point. One case was grievously disturbed by the passing of cars and trucks on a highway three blocks distant. Another patient showed all the manifestations of severe pain and restlessness, in fact, complained bitterly when a gentle breeze struck the skin at any place, because of the pain that it produced. Photophobia is a well-known example of the hypersensitiveness. From a mental standpoint it is just as irritating to ask the patient questions or carry on a conversation in his presence as it would be to rub an open wound in any part of the body. The mere presence of the occasional visitor in the room in a case of acute epidemic encephalitis is a source of irritation and restlessness which may last for hours.

Foci of infection demand most careful and complete removal. This has generally been carried on some time within two or three weeks after the invasion of the encephalitis and should be done with as little disturbance or excitement as possible. In none of the cases in this series have I seen anything but benefit result from the removal of infections after I was sure that primary vehemence of the invasion was subsiding. The elimination of these foci is the most important factor in the prevention of the recurrence of the disease and the later complications.

After the usual mortality of 33.3 per cent has been satisfied, the recurrences and post-encephalitic complications can be reduced to a minimum if two factors are adhered to most strictly: (1) Absolute rest in bed; (2) the removal of infections.

After the so-called acute stage has been passed, the patient then enters the most difficult, and yet the most important, stage of his treatment. In a large majority of cases I have found that encephalitis has occurred in patients where grave domestic or financial trouble has been present. With a return of consciousness and subsidence of the acute symptoms, the patient's old worries returned and became a most serious factor in the retardation of his recovery. With returning strength many patients become strongly insistent on getting up from bed, and if allowed to do so, the incidence of recurrence and post-encephalitic complications is markedly increased. The patient must get a bed philosophy, as it were. It must be impressed upon him that complete mental and physical rest are necessary. The

repetition and explanation of these facts, with insistence on their importance, is probably the only way that this can be accomplished.

Following this stage of energetic determination to reassert himself and take up his active duties, the patient often lapses into a definite period of lack of confidence and a feeling of inferiority. This must be met by suitable psychotherapeutic[79] measures, muscle training, massage and baths—an exercise of patience again, extending over periods of months, until to one's surprise the patient gradually reasserts himself and is able to take a part again in life's activities. As a rule, however, from the standpoint of the business world or household, the majority of these patients seem unable to assume complete responsibility of even the more simple positions.

A word is not out of place in regard to the use of the Rosenow serum. It has been used on a number of cases reported in this series in conjunction with the other methods described above. The number has not been large enough, however, to make comparison with the control series over the same period, so that one is unable to judge the results of the serum. One series of cases is reported by A. J. Hall,[75] where 170 cases were treated with Rosenow's serum; 85 were improved, 43 showed no change, and 40 cases were doubtful. It seems to me that the use of this serum should receive a very thorough and detailed trial. The collected papers of the Mayo Clinics for 1927 show most clearly the results that have been obtained by Dr. Rosenow[55] in the inoculation of animals by material taken from upper respiratory tracts, brain and teeth of patients suffering from epidemic encephalitis. It has been my privilege to see many of these animals at the time that Dr. Rosenow was carrying on this work, and the production of symptoms so similar to that of the patients was most extraordinary.

On this basis, then, the organisms used by Rosenow in the production of his serum bear a close enough relation etiologically to epidemic encephalitis to demand the most intensive use and study of the serum in a condition so baffling and fatal as epidemic encephalitis.

The use of the patient's own spinal fluid intravenously has been strongly advocated by several authorities[52, 53] and was used in several cases. One patient, suffering with extreme myoclonic contraction and twitching, was given 10 c.c. of her own spinal fluid intravenously every five days for four treatments. The result appeared miraculous because the condition rapidly subsided, and yet I have no way of saying that this would not have occurred without the use of the spinal fluid. It seems to do no harm.

To sum up, then, in the treatment of acute epidemic encephalitis, diagnosis is the first and most important requisite; the second, absolute rest in bed and freedom from stimuli; third, repeated lumbar punctures; fourth, removal of foci of infection at a suitable time; and fifth, psychotherapy and physiotherapy directed toward the restoration of the patient's confidence both in his mental and in his physical functions.

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BIBLIOGRAPHY

1. Crookshank, F. G.: Epidemic encephalitis, Boston Med. and Surg. Jour., 182:34.
2. Dunn, A. D., and Heagey, F. W.: Epidemic encephalitis, Am. Jour. Med. Sci. 109:4.
3. Local Government Board Report, London, 1918, No. 121.
4. Neal, Josephine B.: The present status of the etiology of epidemic encephalitis. Jour. Am. Med. Assn., 91:4, 230 (July 28) 1928.
5. Zinsser, Hans: The present state of knowledge regarding epidemic encephalitis. Archiv. Path. 6:2, 271 (August) 1928.
6. Rosenow, E. C.: Streptococci from hiccup, encephalitis, torticollis, chorea. Mayo Clinics, 19:1039, 1927.
7. Strauss, T., and Globus, J. H.: A group of cases illustrating diagnostic difficulties during an epidemic of acute encephalitis. New York Med. Jour. 140, 580 (May 17) 1922.
8. Loewe, L., and Strauss, I.: The diagnosis of epidemic encephalitis. Jour. Am. Med. Assn. 74:1373.
9. Strauss, L., and Hirschfeld and Loewe: Etiology of epidemic encephalitis. New York. Med. Jour., 119:772, 1919.
10. Encephalitis lethargica, Ministry of Health Reports on Public Health and Medical Subjects, No 11, London, p. 76.
11. Heagey, F. W.: Epidemic encephalitis in relation to anterior poliomyelitis, Nebr. State Med. Jour., 7:9, 304 (Sept.) 1922.
12. Wechsler, I. S.: Statistics of epidemic encephalitis. Neurol. Bull., 3:13 (March) 1921.
13. Hopp, W. M., and Mason, V. R.: Epidemic encephalitis. Bull. Johns Hopkins Hosp. 32:363 (May) 1921.
14. Netter, M.: L'Encephalite lethargique, etc. Presse Med. No. 19:121 (April) 1920.
15. Ruhrah, J.: Progr. Med., March, 1922, p. 143.
16. Regan, J. C., and Cheney, G. W. H.: Anterior poliomyelitis—Colloidal gold curves. Am. Jour. Dis. Child (Feb.) 1922.

17. Acute epidemic encephalitis. An Investigation by the Association for Research in Nervous and Mental Diseases, New York City, December 28 and 29, 1920. Hoeber, New York, 1921.
18. Grassman, M.: Sequels of acute epidemic encephalitis. Jour. Am. Med. Assn., 78:13, 959.
19. Bing, R., and Stachelin, R.: Sequelæ of epidemic encephalitis, Schweizerische Med. Wchnschr., 52:6, 1922. Jour. Am. Med. Assn., 78:13, 1008.
20. Collier, J.: Intrinsic diseases of the spinal cord. Oxford Loose Leaf Medicine, Vol. VI, p. 327.
21. Boyd, W.: Epidemic encephalitis. Ann. Med. 1:2, 195 (July) 1920. Am. Jour. Med. Sci., Aug. 1921, p. 248.
22. Flexner, S.: Lethargic encephalitis, poliomyelitis and Australian *x*-disease. Bull. Johns Hopkins Hosp. 31, 353 (July) 1920.
23. Amoss, H. L.: Immunological distinctions of encephalitis and poliomyelitis. Jour. Exper. Med. 33 (Feb.) 1921.
24. Levaditi, C., and Harvier, P.: Etude experimentale de l'encephalite dite lethargique. Presse Med. 28 (April 6) 1921.
25. Thalhimer, W.: Epidemic encephalitis, cultural studies, Arch. Neurol. and Psychiat., 5:2 (Feb.) 1921.
26. Suhat, E., and Crampton, P.: Encephalite epidemique et reaction de Wassermann. Presse Med. 36:358 (May) 1921.
27. Suhat, E., and Crampton, P.: Wasserman test in epidemic encephalitis. Bull. de la Soc. Med. des Hop. Paris, 45:587 (April 29) 1921. Jour. Am. Med. Ass'n., 76:25, 1801.
28. Eskuchen, Karl: The cerebro-spinal fluid in epidemic encephalitis. Ztschr. f. d. ges. Neurol, u. Psychiat.: Berlin, 76:569 (May 31) 1923. Internat. Med. and Surg. Survey, 4:3, 376.
29. Sprunt, T. P.: Epidemic encephalitis: an analysis of fifty cases. Baltimore, Md.
30. Neal, J. B., Jackson, H. W., Appelbaum, E.: A study of four hundred and fifty cases of epidemic encephalitis. Am. Jour. Med. Sci. 170:711-722 (November) 1925.
31. Alford, L. B.: Dextrose in treatment of epidemic encephalitis. Jour. Am. Med. Assn., 91-10, 758 (Sept. 8) 1928.
32. Doyle, J. B.: Clinical manifestations and treatment of epidemic encephalitis. Calif. and West. Med., Nov. 1924, pp. 561-562.
33. Marx, E.: Treatment of epidemic encephalitis with acriflavine. Jour. Am. Med. Assn., 90:13, 1063 (March 31) 1928.
34. Collins, J. Rupert: Protein shock in epidemic encephalitis. Brit. Med. Jour., 3382:745 (Oct. 24) 1925.
35. Faure, R.: Encephalite lethargique et reaction de Wassermann. Thesis, Paris, 1920.
36. Sepp, E. K.: Treatment in epidemic encephalitis. Practical Medicine Series, 1927, p. 88.
37. Billigheimer, E.: Mercury treatment in epidemic encephalitis. Jour. Am. Med. Assn., 81-19, 1467 (Nov. 10) 1923.
38. Denichau, D., and Barbary, J.: Treatment of epidemic encephalitis. Jour. Am. Med. Assn., 85:13, 1008 (April 24) 1925.
39. Epstein, S. H., Farnham, R. K., and Cobb, Stanley: The use of salicylates in the treatment of chronic epidemic encephalitis. Jour. Am. Med. Assn., 90:15, 1250 (April 14) 1928.
40. Buss, C.: Treatment of epidemic encephalitis with acriflavine. Deut. Med. Wchnschr., Berlin, 49:476 (Apr. 13) 1923. Jour. Am. Med. Assn., 81:3, 258.
41. Enderle, P.: Parkinsonian syndromes in post-epidemic encephalitis. Jour. Am. Med. Assn., 85:6, 472.
42. Kubie, I. S.: Treatment of epidemic encephalitis: Forced drainage of cerebro-spinal fluid. Jour. Am. Med. Assn. 91:4, 278 (July 28) 1928.
43. Gregory, M. S.: Epidemic encephalitis, Jour. Oklahoma State Med. Assn., 20, 192-196 (July) 1927.
44. Ziegler, L. H.: Follow-up studies on persons who have had epidemic encephalitis. Jour. Am. Med. Assn., 91:3, 138 (July 21) 1928.
45. Stern, F.: Treatment of epidemic encephalitis, Jour. Am. Med. Assn., 83:10, 800 (Sept. 6) 1924. Med. Klinik, Berlin, 20, 1027 (July 27) 1924.
46. Winkler, G.: Treatment in epidemic encephalitis. Jour. Am. Med. Assn., 89:17, 1465.
47. Rosenow, E. C.: Specific serum treatment of epidemic encephalitis—further results. Jour. Am. Med. Assn. 80:22, 1583 (June 2) 1923.
48. Helmholz, H. F., and Rosenow, E. C.: Three cases of acute encephalitis treated with specific serum. Jour. Am. Med. Assn., 79:25, 2068 (Dec. 16) 1922.
49. Henner, K.: Levaditi's vaccine in epidemic encephalitis. Jour. Am. Med. Assn., 84:22, 1707 (May 30) 1925.
50. Moore, Ross: Treatment of epidemic encephalitis. Jour. Am. Med. Assn., 81:2, 131, July 14, 1923. Jour. Am. Med. Assn., 81:11, 928 (Sept. 15), 1923.
51. Craig, R. N., McGowan, P. K., Cook, L. D.: Malaria treatment in epidemic encephalitis. Jour. Am. Med. Assn., 89:25, 2147 (Oct. 22) 1927.
52. Power, R. W.: Myoclonic epidemic encephalitis, treated by patient's spinal fluid. Jour. Am. Med. Assn., 83:8, 645 (Aug. 23) 1924. Brit. Med. Jour. June 28, 1924.
53. Piticarlu, I.: Treatment of myoclonias and the Parkinsonian symptom complex following epidemic encephalitis with intravenous injections of patient's cerebro-spinal fluid. Wien. klin. Wchnschr., May 11, 1922. New York Med. Jour., 425 (Oct. 4) 1922.
54. DeBrun, H. C.: Hiccup ("singultus"). New York Med. Jour. 113:15 (June 1) 1921.
55. Rosenow, E. C.: Diaphragmatic spasms in animals produced with a streptococcus from epidemic hiccough. Jour. Am. Med. Assn., 76:25, 1745 (June 18) 1921.
56. Bernard, R., Marchal, and Bureau, Y.: A case of acute encephalitis treated by intravenous injections of sodium salicylate with glucose. Bull. et mem. Soc. med. d. hop. de Par., 50:1751.

57. Eden, G., and Yates, A. L.: Treatment of epidemic encephalitis. Jour. Am. Med. Assn., 89:3, 248.
58. Eden, G., and Yates, A. L.: Treatment of encephalitis lethargica by the removal of possible etiological factors. Brit. Med. Jour. 1:714, July 16, 1927.
59. Flexner, S.: Obvious and obscure infections of the central nervous system. Jour. Am. Med. Assn., 91:1, 27 (July 7) 1928.
60. Freeman, W.: Specific and non-specific remedies in the treatment of encephalitis. Jour. Am. Med. Assn., 89:1317 (Oct. 15) 1927.
61. Glesinger, M.: The treatment of acute encephalitis. Med. Klin., 23:127, 1927.
62. Fornara, P.: Treatment of acute encephalitis, Policlinico (sez. prat.) 34:1409, 1927.
63. Gibson, C. L.: Ether intramuscularly for hiccough. Jour. Am. Med. Assn. 80:399 (Feb. 10), 1923.
64. Goutenberg, R.: Encephalitis: epinephrine and atropine. Jour. Am. Med. Assn., 89:14, 1186 (Oct. 1) 1927.
65. Freeman, W.: Treatment of epidemic encephalitis. Jour. Am. Med. Assn., 89:16, 1317.
66. Lhermitte, J.: Le hoquet epidemique. Presse Med. 93:916 (Dec.) 1920.
67. Leiner, J. A.: Spontaneous cure of a case of epidemic encephalitis following an attack of pneumonia. Jour. Am. Med. Assn., 81:15, 1284 (Oct. 13), 1923.
68. McCowan, P. K., Harris, J. S., Mann, S. A.: Scopolamine in postencephalitic lethargy. Jour. Am. Med. Assn., 86:24, 1869 (June 12) 1926.
69. Matthew, E.: Treatment of epidemic encephalitis. Jour. Am. Med. Assn., 983:4, 307 (July 26) 1924.
70. Paulin, D.: Autoserotherapy in epidemic encephalitis. Jour. Am. Med. Assn. 85:14, 1095 (Oct. 3) 1925.
71. Paulian, D.: Contributions to the study of the treatment of epidemic encephalitis and its sequelæ. Marseilles Med. 62:945-955 (June 5) 1925.
72. Radovici, A.: Action of atropine on motor disturbance from epidemic encephalitis. Presse Med. 33, 555 (Apr. 29) 1925. Jour. Am. Med. Assn., 84:25, 1966. June 20, 1925.
73. Sison, A. B. M.: Treatment of epidemic encephalitis. Philippine I. Med. Assoc. Jour. 4:312 (Aug.) 1924.
74. Visher, J. W.: Epidemic encephalitis treated with mercurochrome. Jour. Am. Med. Assn. 83:4, 305 (July 26) 1924.
75. Hall, A. J.: Treatment of epidemic encephalitis. Lancet, 2:617 (Sept. 20) 1924.
76. Heagey, F. W.: The cerebellar manifestations of epidemic encephalitis. New York Med. Jour. (Sept. 20) 1922.
77. Riggs, C. Eugene. Notes on epidemic encephalitis. Minn. Med., 10:100-11 (Feb.) 1927.
78. Achard, P.: L'Encephalite Lethargique. P. 265, J. B. Bailliere et Fils, Paris, 1921.
79. Winner, A.: Chronic epidemic encephalitis. P. 326, William Heinemann, London, 1924.
80. Dowman, C. E.: Relief of diaphragmatic tic, following encephalitis by section of phrenic nerves. Jour. Am. Med. Assn. 88:95, 1927.

DISCUSSION

Dr. L. H. Ziegler (Rochester, Minn.): At the Mayo Clinic we have seen relatively few cases of acute epidemic encephalitis. Occasionally patients are brought here in the acute stage, but most of the cases are in the chronic stages. It has been our experience that 25 to 30 per cent die. Seventeen per cent of those we saw in the acute stage are well. I have on record several patients who had an acute attack of epidemic encephalitis and were seemingly perfectly well for from five to seven years, when chronic sequelæ came on. We know of one or two who in the acute stage received nothing but spinal drainage and are now perfectly well. We cannot be very enthusiastic about what we have done for these patients.

Dr. E. M. Hammes (St. Paul): I was very much interested in Dr. Heagey's paper, particularly in the surprisingly high percentage of recoveries he was able to obtain. We have not been so fortunate. In a series of approximately 800 cases which we encountered since 1919 I do not believe over 1 per cent made a complete and permanent recovery. A much larger percentage recovered sufficiently to return to their former occupations and life of usefulness, but manifested some sequelæ such as reflex changes, mild motor or sensory defects, central pains, tics, and so forth, and particularly slight but definite personality changes. In others there was a recurrence. The longest interval was in a woman who made a complete recovery, remained well for one year, then had a flare-up of her old symptoms and has been an invalid ever since. During the acute phase our treatment consisted in prolonged rest in bed, frequently repeated spinal drainage until the pressure became normal, salicylates or acriflavine intravenously.

IMPRESSIONS FROM A SURGICAL STUDY-TRIP ABROAD*

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THE attention of the American visiting German medical institutes for the first time is immediately arrested by the distinct separation of all the clinical units. In fact, each teaching branch represented in the curriculum, when its importance and size justifies it, has its own building: surgery, internal medicine, obstetrics, together with gynecology and other specialties. Each has its own hospital, and, as the visitor is soon to learn, this individuality pervades the German system of medical education.

Each hospital unit has its own laboratories, including complete *x*-ray equipment and other paraphernalia necessary for diagnosis and treatment, or essential to clinical or experimental investigation.

This duplication of facilities, especially in the way of laboratory equipment, strikes the visitor from an American hospital as a frank abuse of economy, and contributory to a spirit of independence and lack of co-operation between departments. However, this individuality is fundamental and basic in their plan, and herein lies the secret of the success of German schools in the training of men destined to go far in their profession.

Shut off from daily contact with his colleagues in other specialties, the German professor of surgery develops an independence of reliance on his colleagues in other specialties that is really remarkable. He learns and masters all the diagnostic and therapeutic agents necessary for the care of the patients for whom he is responsible.

It was my good fortune, while an assistant in the surgical clinic of Berne, to see this method in operation at its best. Here, Prof. de Quervain, Kocher's successor and one of the most distinguished of his many pupils and followers, is a shining example of individuality in the practice and teaching of surgery. To all American students of medicine, he is known for his nonpareil "Textbook of Clinical and Surgical Diagnosis" and for his work in the field of goiter. When one observes him localize a lesion in the brain or examine the gastro-intestinal tract roentgenologically, with the same facility with which he arrives at a differential diagnosis in the case of goiter, one's admiration is at once aroused. In the field of operative surgery, he performs the wide range of procedures that come within the broad scope of general surgery.

Privileged to work at a problem under his guidance, I had the opportunity to learn at first hand some of the ramifications of his knowledge. I soon realized that it extended to books, apparatus, the preparation of microscopic sections, photography and other essentials requisite to investigation, in the same degree as in the care of patients.

In this regard, Prof. de Quervain probably represents the acme of scholarship in surgery. Such is the aim of the German system† of training. As can readily be appreciated, it is purchased only through a long period of training assiduously devoted, without stint of personal sacrifice, to the attainment of an ideal—the acquisition of skill and knowledge.

UNDERGRADUATE INSTRUCTION

Our medical undergraduate, accustomed during the last two years of his course to daily contact with patients in the wards and outpatient departments, would find the German system deficient in this particular. Their student obtains his clinical training entirely through systematic lectures and clinics. German schools consider it essential that the greater portion of the teaching in each division emanate from the personality of the Chief of the Department. Intimate contact between student and patient in the ward doesn't exist, and takes place in only a desultory fashion, for a very limited period of time, in the outpatient department.

The English system of clerks and dressers‡

*From the Department of Surgery of the University of Minnesota. Presented before the Study Club of the Ramsey County Medical Society, Nov. 15, 1928.

†No attempt is made to submerge Swiss surgery in the German. In Switzerland, a country about half the size of Minnesota but with twice the population of our state, there are five medical schools. German is the language of the schools at Berne, Basle and Zurich, while Lausanne and Geneva belong to that part of Switzerland where French is spoken. The schools of German Switzerland have frequently had German professors as heads of their departments, and their clinics as well as their methods of teaching are typical of those seen in Germany. The late Kocher as well as Prof. de Quervain, however, are native Swiss.

‡We employ the designation "clerks" for both medical and surgical ward students.

has furnished the prototype for our own method of ward instruction, and it is in England that we find the practical training of students at its best. Brought into contact with patients about a year earlier in their career than our students, and drilled daily in making physical examinations and history-taking, later actively participating in operations, we find the English student emerging from his medical undergraduate days less imbued with the theories of medicine but well-versed in its practice.

Fortunately for the German student, he usually spends a year or more on hospital services before going into practice, without which apprenticeship he would be completely at sea in the care of patients.

In France, when the student commences his studies of anatomy and physiology, he attends the hospitaly daily, where, in small groups, he is shown and taught the elementary but cardinal symptoms and physical findings of the "pathology of the living." Then, as he progresses in his studies, he may, in considerable degree, elect the nature of his work, the contact with the patient being ever kept in the foreground.

Certainly, the practical apprenticeship can be overdone. To stimulate a student's best efforts and to whet his curiosity and interest by an early contact with patients, is a commendable practice and an innovation that should find wider approval in our schools. Half of the beginner's time spent in this manner, however, as exists in some French schools, would seem to be a misuse of serious effort. The daily attendance of surgical dressers as assistants in the operating theater, as practiced in England, I should consider misplaced zeal.‡

The problem of methods of teaching and training in medicine is a very important one. No wholly satisfactory scheme exists. At the termination of the systematic period of instruction, there is no doubt that the English graduate is the best qualified practitioner. Whether the product of such a training is any better, when the inequalities of method have been partially erased by a year or more of hospital interneship by representatives of each group, is a pertinent query.

A feature of the English method, contributory to no ultimate good, is the optional (and too frequently elected) direct entry from the high or preparatory school to the medical college. True, the graduate attains to an earning capacity earlier than elsewhere, but frequently at an age immature for the exercise of that judgment demanded of one concerned with the care of human life, and lacking in that preparation so valuable to one anxious to pursue further the search for knowledge.

The academic freedom allotted the German medical student is interesting; attendance at the various classes is not compulsory. A successful acquittal at the final examinations, after having exhibited satisfactory evidence of registration for an adequate number of school sessions, fulfills all requirements. Free from obligation or responsibility in the ward, and attached to any one institution only by loose ties, the German medical student† is at liberty to migrate about with the seasons as his taste for lecturers or diversions dictates. One semester may find him in Berlin, another in Freiberg or Heidelberg, and another even in the Viennese school in Austria.

An institution in the British Isles that is popular not only with the undergraduate student, but with every physician, as well, is the pathological museum. Every hospital has one, where the student may, throughout his entire course of instruction, seek out and study the objective effects of disease on the organism. In this manner, the student is in a position to more effectually correlate the symptoms of disorder with their issue in the body. In London, the medical student in like manner has access to the Museum of the Royal College of Surgeons, to which the rest of the world can boast no equal. Here physician and student may come for enlightenment, in any detail of gross morbid anatomy that he wishes to study. The specimens are exposed on shelves in excellently lighted rooms, and arranged with reference to anatomical and disease subdivisions. An unusual and most valuable feature is that each shelf has a book in which not only is to be found a description of the specimen, but the medical history of the patient who contributed the specimen!

‡Kocher believed that students should be taught the possibilities of what surgery could offer patients and the principles of the commonly performed operative procedures. The manner or technic of their performance he taught only to graduates desirous of acquiring a surgical training, and only infrequently did he operate before student clinics.

†Women medical students are numerous in Germany. Several schools in England exclude women.

POST-GRADUATE TRAINING IN SURGERY

In the teaching hospitals of England, even where professorial units exist, the so-called full-time professor shares equally in the division and care of patients with his fellow colleagues who have hospital appointments. In consequence, a surgical division of 250 to 300 beds in England or Scotland will have five to six or more full surgeons, and as many junior surgeons, in attendance, many of whom use their hospital appointment as a high road to private practice. In such a plan, the attainment of a surgical training goes hand in hand with the simultaneous acquisition of a private practice.

Contrast this with the German plan:

It should be stated that the German teaching hospital is essentially a monopoly. Each university clinic is in sole charge of the chief, who in his small domain exercises an almost unqualified jurisdiction, the like of which, I dare say, no monarch can boast. All the beds in the hospital come under his direct supervision. This system, it may truthfully be said, smacks somewhat of the military. And, answerable to this professorial regent or general are "Oberärzte" (colonels)*, "Secundärärzte" (majors), "Ersteassistenten" (lieutenants), "Assistenten" (noncommissioned officer), and "Volontäre" (volunteers), the number of each group depending on the size of the clinic and the inclinations of the chief.

In this unit, each man who has elected to follow surgery as a career works intently and earnestly, with no thought of the immediate future, succeeding through merit and accomplishment to each successive station. With the years, he masters all the diagnostic procedures and accedes to an enviable operative experience.

Despite the diversified interests in the field of general surgery, one finds in the German surgical clinics recognition of the fact that progress comes only through intensified effort and specialization. But the error too often committed in our own country of acquiring a special training before an adequate foundation is laid in a more general one, is rigidly and fundamentally avoided. Even though the character of the work in a clinic may, through the interests of its chief, take such a turn that it is referred to as a chest, urologic, goiter, or clinic of plastic surgery, the man of these special interests remains always essentially a general surgeon.

RESEARCH

Though considerable excellent research is being carried out in the British Isles, no premium is placed upon investigation by the English school of surgery. In Germany, on the contrary, investigation is made the incentive for advancement† in the clinic. This necessity or seeming compulsion to engage in research work is probably in no small degree responsible for the great volume of publications emanating from German clinics.

In order to qualify as "Privat Dozent" (instructor), the aspirant for an academic career in Germany must absolve the "Habilitationsschrift." This demands that the candidate submit to the faculty of the University original work demonstrating his ability to do investigation of a character deserving of recognition. This being accomplished, the continued performance of good work in the clinic, combined with a manifest interest and desire for investigation, coupled with reasonably good behavior, brings the promise of a professorship in a few years.

Once having acquired a professorship, even though its holder leave the university to engage in private practice, he still retains the title. If, every three years, he expresses a willingness to give a course in the department where the title was obtained, no matter whether any students accept the proposal and register for the course or not, there is no occasion for alarm concerning forfeiture of the appellation for another three years. Even though the prefix professor was won in the department of anatomy, its possessor, if he engages in the practice of surgery, is known as Prof. Dr. X, Surgeon.

Appointment as surgeon or physician to a municipal hospital in Germany is highly valued and much sought after.‡ Even though cherishing an ambition to succeed to the direction of a university surgical clinic, when pressed by the economic needs of a growing family, the bankrupt professor finds adequate consolation and solace in such a position. Here, he may follow his bent for investigation as freely as in the university clinic. Too frequently, however, the

*The synonyms in parentheses are mine.

†Competitive examination in France is an important criterion for promotion.

‡The occupant of this office is usually designated "Primarius." The duplication of X-ray and other laboratories found in the University clinics does not exist in the municipal hospitals.

sudden prosperity brought about through the acquisition of a large and lucrative private following, that often accompanies such an appointment, chills the ardor of the scientific aspirations of the ambitious professor.

The same self-sufficiency characterizes the research in Germany as is manifested in the clinical training. The assistant attached to a clinical unit doesn't hesitate to embark upon a line of research that we are wont to feel belongs more correctly in the province of physiological chemistry or other pre-clinical science. When necessary, such an assistant may interrupt his clinical work for a year or more (a rather common occurrence) to apprentice himself to a laboratory to learn at first hand some technical procedure necessary in the solution of the problem he is investigating in the clinic.

This plan helps to bring to the clinic the advantage of the advances in other fields of endeavor and aids in effecting a correlation between discovered fact and its therapeutic or other practical application. One serious evil, however, lurks in this otherwise excellent scheme. The professor who assigns the subject for investigation may be totally incapable of exercising critical judgment on the results, and may be unable to evaluate the merits or recognize errors in the work. Consequently such work occasionally is lacking in that stamp of assurance, and goes begging for approval, which the work would sooner obtain were it the product of the combined effort and "team-work" of clinical and preclinical laboratories.

The bulk of investigation done in the German clinic partakes of that great influence that German pathology has had on medicine in general. With their extreme regard for thoroughness, it is not surprising to find that every specialty has its "Ergebnisse" in which are to be found exhaustive reviews and digests in which are linked and correlated the observations of others, with those of the essayist.

In England, the influence of systematic anatomy envelops the surgeon and his investigations. One would rather expect to find that the teachings of their brilliant physiologists had wedged their way securely into the thoughts of surgery. Custom and tradition here are, however, not easily set aside, but perhaps the experimental laboratory that Wilkie has so successfully established in Edinburgh is a herald of the extensions of the triumphs of physiology and experimental medicine into English surgery.

True to the precepts of their famous master, the illustrious John Hunter, the usual English surgeon finds greater comfort in recording his own observations unassociated with an analysis of the recorded studies of others. It is said that when John Hunter was challenged with ignorance of the classical languages by a certain Jesse Foote, his reply was, "I can teach Jesse Foote on the dead body more than is known in any language, dead or living."

HOSPITALS

The hospital system in Germany has been briefly sketched. I should like to dwell here a little on the general plan of the hospital buildings. As has been previously stated, each clinical unit is a hospital in itself. The Eppendorfer Krankenhaus at Hamburg, built about 45 years ago, has furnished in Germany the prototype for many others of its kind. The surgical, medical and other units are all split up into small pavilions, one to two-story buildings, where the patients are housed in a large ward of fifty to seventy-five beds. Most of the clinical divisions being very large (in our sense),† there may be as many as six to ten of these pavilions in a single surgical unit. Frequently, as in Hamburg, they have no direct communication with one another, necessitating the transport of an operated patient to his bed, even in the dead of winter, from the surgical pavilion. Often separating these structures, however, are beautiful trees, flower beds, and springs of flowing water, where the convalescent patient may bask in the sun, feast his eye on luxurious gardens, enjoy the fragrant atmosphere of a spring morning, and forget his troubles that brought him to the hospital.

More and more, however, these pavilions are being less frequently built. Whatever quality of beauty or comfort they may have possessed is being sacrificed to the greater convenience and lesser cost of service that the more compact multiple story (3-4) structure affords. Any one visiting the Rudolf Virchow Krankenhaus in Berlin on a beautiful morning in May or June may, in a way, share the regret that many of

†It would appear to be the ambition of many German clinics to make their unit a miniature army. Payr at Leipzic has between 500 and 600 beds under his supervision! And there are many others almost equally large. Ward visits by the chief on such services consist usually in seeing the cases that interest him or need his consultation. Complete "ward-rounds," if made, are usually somewhat of a marathon.

the Germans express on the passing of the pavilion hospital plan.

In many clinics in Germany, a keen and special interest in the lighting and arrangement of the operating theatre is in evidence. The operating rooms of the average university clinic are, on the whole, much larger than ours, and attached to each operating room are usually one to three smaller rooms, employed for the induction of anesthesia, scrubbing of the hands, and other preparatory procedures. The operating room itself contains generally only those essentials requisite to the performance of the operation. In most university clinics, there is still the large amphitheatre more fashionable in days of the past, where the chief, on the conclusion of his didactic clinic, could thrill the students with a demonstration of his boldness, or exhibit his skill with scalpel and needle.

In a few clinics, the operating tables, two to three in number, are all in the same room. In every clinic, a sharp distinction is made between "clean" and "dirty" cases. Infected cases are always operated in the small septic operating rooms set aside for this purpose.

Following the example of Heller at the St. Georg Krankenhaus in Leipzic, the employment of dull blue drapes, instead of the conservative white, to diminish the reflection of light, has come into fairly general use. In several hospitals, a complicated series of overhead mirrors are employed to utilize the sun's rays to the best advantage in the lighting of the operating theatre. In this manner, a well-lighted room, without the blurring effect of direct sunlight, is obtained.

Operating usually without the aid of artificial light, the German surgeon enters the operating theatre, and usually only removes his waistcoat, dons a heavy rubber apron and heavy boots, and does the most trying operative procedures in his stiff shirt and stand-up collar, and rarely perspires. Their operating rooms, however, are somewhat cooler than ours, and, being larger, the humidity doesn't become as great. These latter facts are also attested in the behavior of the patients. Rarely does one see there, after a prolonged ether anesthesia, the gown of the patient drenched with profuse perspiration, as may so frequently be seen in our own clinics.

Aside from the fascinating tradition with which many of the London hospitals are replete, perhaps the most interesting feature of their hospitals is the collection box that can uniformly be found in a prominent place outside and in several inside, begging contributions of money or tinfoil necessary for the execution of obviously needed improvements.

In London are to be seen many small special hospitals, very modest in appearance and equipment, but universally known for the excellence of the work done there. St. Peter's Hospital for Stone, with only thirty-two beds, is famous for the character of its urological work. Here Freyer did his pioneer work in surgery of the prostate. St. Mark's Hospital for Rectal Diseases, to which a new addition has recently been built, can boast of a Salmon and two Allinghams, physicians of the past who, by their pioneer work in diseases of the rectum, have shed glory on their hospital. At the Gordon Hospital for Rectal Diseases, of thirty beds, equally as good work may be seen.

In England, the large private hospitals do not exist, private patients being cared for in small nursing homes.

Though, in many of our states, there are as many or more physicians in proportion to the population as in European countries, the opportunities for private gain in general practice are much better in our western states, at any rate, than in the British Isles or on the continent. The widely disseminated health insurance and "panel" system of medical practice makes for a proportionately small group of strictly private patients. In consequence, measured by our standards, their free hospitals are much more numerous.

In Copenhagen, truly socialistic medicine is in full sway. At the Rigshospitalet* anyone in Scandinavia can come and get the best of care for a most modest hospital fee, without incurring a pecuniary debt to the physician. The physician cannot ask a fee of the patient, but the latter may, if he desires, manifest his gratefulness by presenting his physician with a gift. There being no obligation on the part of the patient to do so, this demonstration of appreciation is usually omitted. There are, of course, also private hospitals in Copenhagen. I think it would be safe to venture the conjecture, however, that private practice is not an eminently successful enterprise.

*The Rigshospitalet, where the late Rovsing worked, and the Bispebjerg, are two of the finest hospitals in Europe.

The European standard of nursing differs a good deal from our own. Certainly in no country does the hospital patient obtain the individual attention that the ward patient enjoys in our hospitals. The German nurse is frequently lacking in any serious preliminary education, but combines in sympathy of heart and industry of body the qualifications that their clinicians prize as the essentials for those who tend the sick. Many of their men who visit our hospitals express surprise that our nurses should "paint and powder" and enjoy the privileges of social intercourse with other mortals. The day is long past when the assumption of a serious mien was the true indication of the earnest Christian, or a frank necessity for the preacher of the gospel. Neither should there be need for such hypocrisy in the field of nursing.

SURGERY

What of the surgery? It would take us too far afield to discuss in more than the most superficial manner the commonly practised operative procedures. Certainly, it can be said that there is no typically European surgery. Where in our country are there any two clinics that place the same emphasis in practice on asepsis, hemostasis, the avoidance of unnecessary trauma to tissue, time and other factors in operative technic?

If one were to generalize at all, one might say that the surgery of Germany, on the whole, has a tendency to be radical, that of England conservative, and that of France brilliant but provincial.

The visitor in Paris, I am certain, often wonders how their surgeons manage to operate with gloves as thick as those worn by our pathologists doing necropsies. Then their dexterous employment of the Reverdin needle (scarcely ever seen in use elsewhere) is often astounding.

Certainly, in England one sees developed to its best that interest in the patient that we refer to as a "surgical conscience." The question of which procedure will best suit the individual case receives deliberate consideration. Excepting the enthusiast, one rarely sees here a surgeon's fervor for a given procedure influence him to perform it without adequate indication.

ANESTHESIA

In England, where a general anesthetic is always given by a physician, the anesthetist figures prominently in every operation. Nowhere can one see ether more skillfully administered than here. For intratracheal anesthesia, automatic control machines are in general use. Local anesthesia for general surgical procedures is rarely to be seen in the British Isles; ethyl chloride, nitrous oxide, ether and chloroform constitute the usual anesthetic armamentarium of almost every operating theatre.

In France and Germany, local anesthesia receives general application. First received with favor following its introduction more than forty years ago, then practically abandoned, spinal anesthesia is once more becoming popular.

In northern Germany especially, avertin (tribrom ethanol) anesthesia enjoys wide use in many clinics. It is given in aqueous solution as an enema about half an hour before operation. Those who have had the widest experience with the method do not attempt to induce complete anesthesia with the drug. To secure complete relaxation for abdominal surgery with avertin alone would place the respiratory centers in grave jeopardy. For extremity surgery, this incomplete anesthesia with avertin seems quite adequate; when operating in the abdomen, reinforcement of incomplete avertin anesthesia with a small amount of ether is necessary. Something to be said in favor of the method is that anesthesia may be induced in bed without the patient's knowledge—a great advantage in certain cases.

Another drug intended to supplant inhalation anesthesia in use is pernocton, a barbital preparation. The drug is injected in a few c.c. of solution intravenously, into a vein of the forearm, and after a few seconds the patient is unconscious—a very impressive sight for the observer. Safety indicates that no attempt be made to secure complete anesthesia with pernocton alone. A fairly large number of deaths have resulted from both avertin and pernocton anesthesia, when this rule has been ignored. Of the two drugs, avertin has received more general approbation and enjoys continued wide usage as the safer anesthetic agent.

ASEPSIS

As one would expect in conventional England, a uniformity of practice exists with reference to the regard for asepsis. No vestige remains today of that long and stubborn opposition to the

introduction of Lister's principles, the greatest boon that surgery has ever known.

In German clinics, as in other matters, every man is a law unto himself. Every gradation, from an almost total disregard for the generally accepted importance of asepsis to the most painful precision in the preparation of the hands and the operative field, is in evidence. Surgeons may be seen to operate with sleeveless gowns, without masks or caps, without gloves, or with cotton gloves drawn over the usual rubber. And thus with every detail of the technic. In France or Italy, one is likely to see "breaks of sterile technic" far more commonly than in our hospitals.

SURGICAL TECHNIC

The control of hemorrhage by the initial ligature of the blood supply to the field of operation, wherever feasible, is the keynote of German operative technic. This principle is so thoroughly a part of the German surgeon that it is not surprising to see him ligature the four thyroid arteries before making a direct attack upon a goiter or even ligate both internal iliac arteries when doing the combined abdomino-perineal excision of the rectum. With his ligature carrier, he encircles each vessel that requires division and cuts between. The ordinary hemostat is used only to catch bleeding points where a preliminary ligature of the vessel cannot be effected. At any one time, therefore, the number of hemostats in use during an operation is very small.

Silk is largely relied on for suture material and ligatures as well. The continuous suture is rarely seen. When using catgut, whether for ligature or suture, the same employment of a more than generous length, which, when tied, necessitates the wasteful discard of two comparatively long strands, may be universally observed.

In the various provinces of general surgery, one may see in German clinics excellently executed operations performed most everywhere. In the field of gastric surgery, with special reference to duodenal ulcer, one is likely to find the common surgical practice at variance with that generally observed in our own clinics.

In the surgical clinics, at any rate, one hears no mention of the spontaneous or induced healing of ulcers on medical management, and gains the impression that the diagnosis of ulcer constitutes an indication for removing a good portion of the stomach, whether the lesion be in the duodenum or stomach. The frequency with which one may see a partial gastrectomy done, when to the disinterested observer no convincing gross evidence of a lesion is apparent even after the excised specimen is laid open, is an indication of the ardor and a measure of the enthusiasm with which this excellent operation is sometimes adapted to the patient. The quality of the gastric surgery in Germany and Austria, however, is on a very high plane, and nowhere, perhaps, can one see gastric resections done, from clinic to clinic, with such uniform skill.

Not all the German clinics, however, have accepted gastric resection as the operation of choice for duodenal ulcer. Among those who still maintain faith in gastro-enterostomy as a remedy for duodenal ulcer are to be mentioned the clinics of Professors Küttner at Breslau, and Hochenegg at Vienna, both of whom, by a study of their operated cases, find the results so satisfactory as to warrant continuance of the practice. Professors Guleke of Jena and de Quervain prefer to do an anterior gastro-enterostomy coupled with an entero-anastomosis when operating for duodenal ulcer.

The stoneless gallbladder is much less frequently removed in German clinics than in our country. In this particular, their surgeons find us equally as radical as they are in the field of gastric surgery. The persistence of symptoms in a definite percentage of cases, following the removal of a diseased gall bladder, they feel does not warrant the extension of the method to "prophylactic removal of the gallbladder to obviate stone formation."

There is an increasing tendency in Germany toward conservatism in the treatment of bone and joint tuberculosis. In many clinics, practically all cases are treated by heliotherapy, and the other adjunctive measures, with only infrequent recourse to surgical fusion operations.

Skeletal traction in fractures of the lower extremity has completely supplanted skin traction with adhesive tape in German clinics. The Steinman nail and calipers are everywhere in vogue. More recently, Kirschner of Tübingen has devised a method of piercing the tibia or femur with an electrically driven fine but strong piano wire.

Germany is lacking in the number of keen exponents of neurologic surgery that we have in

our country, and in the surgery of the brain, at least, a lack of development parallel to that present in general surgery as a whole, is generally conceded. At Breslau, Prof. Foerster, an organic neurologist by training, who has acquired the art of surgery, represents a new spirit in neurologic surgery. Emboldened by a thorough knowledge of the physiology and anatomy of the nervous system, he is launching an attack on diseases which affect it that previously, by common consent, were tendered the neurologist for diagnosis, observation and whatever comfort he could bring the patient.

This invasion of the province of surgery by the internist has long had its precedent in Germany in the field of chest surgery. Disappointed with the results of conservative waiting in the treatment of adhesive pericarditis and pulmonary tuberculuosis, Prof. Brauer, an internist of one of the medical divisions of the Eppendorfer Krankenhaus, long ago took over the surgery of these conditions as a therapeutic agent belonging in the repository of the armentarium of the specialist in diseases of the chest.

While still at Munich before taking over Hildebrand's post at the Charité in Berlin, Prof. Sauerbruch, convinced of the value of good nutrition in the treatment of tuberculosis, sent many of his patients with pulmonary tuberculosis to a special hospital at his disposal for a prolonged dietary preparation for operation. This principle, together with Hermansdorfer, he has already extended to other chronic infections, believing that the P_H of the inflammatory area may be influenced through diet.

Under the leadership of Gaza and Brandi now of Rostock, this principle has been adapted to the local treatment of suppuration, the wound being alkalinized when the discharges are acid and acidulated when alkaline.

The iniection of thrombosing solutions for varicose veins in the lower extremity has in many places practically superseded the operative treatment. In many clinics, simple hydroceles of the tunica vaginalis testis are treated, with good results, by the evacuation of the fluid and the injection of a drop of phenol into the sac.

Many of these measures would, on first thought, appear to be reversions to the order of procedures of subcutaneous surgery, practised when the safety of the open operation had not been firmly established. The safety and efficacy of these latter procedures, however, appears to be of established value.

One need not travel far from his accustomed sphere of activity to appreciate that even many of our apparently fixed principles may be subject to revision. Neither the science nor the art of surgery is free from the dogmatism or fads that affect other lines of endeavor; and the difficulty of separating the "wheat from the chaff" is frequently no light matter.

It is also difficult to escape the impression that surgery is constantly changing—even for one who has lived so few surgical summers as myself. The vain taunt so often expressed in the past that surgery, and especially its technic, has reached its pinnacle, finds utterance today. Fortunately, however, progress in our sister sciences quickly dispels this complete satisfaction with ourselves and our methods.

VALUE OF FOREIGN STUDY

It would be an omission were I not to say something of my impressions of the merits of foreign study. Thirty years ago, a medical training was incomplete without a period of foreign training. The increasing frequency with which the earnest European seeker after knowledge in medicine crosses the Atlantic to investigate our methods indicates the present high position of North America in world medicine. Today, it can truthfully be said that study abroad for the graduate of our schools is not so important, and certainly no longer indispensable. However, such study still constitutes an asset, the acquisition of which is very much worth while.

One who goes away expecting privileges or opportunities in foreign clinics that he cannot enjoy in his own is quickly disillusioned. The value of such study lies rather in the acquisition of knowledge of other methods and new ideas. A well-known English surgeon in a well-known London hospital told me one day that all he knew of surgery he had learned in his own hospital. From what I saw and heard from him, his statement may well not have been an exaggeration. The frequency with which our outstanding men of medicine make pilgrimages to foreign clinics indicates the value they place on an interchange of ideas. At the same time, it is an expression of their willingness to learn from others—a distinct mark of progressiveness, which, fortunately, manifests itself throughout our country in every activity.

DIAGNOSIS AND CLASSIFICATION OF THE VARIOUS FORMS OF BLADDER NECK OBSTRUCTION*

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Saint Paul

ONE of the most important, and in many ways one of the most difficult, problems of urology is that furnished by obstruction to urination at the vesical neck. A large proportion of such obstructions are caused by benign hypertrophy of the prostate and are easily recognized. However, to think of prostatic hypertrophy as the only cause of the condition is to have a very distorted aspect of the problem.

A large minority of bladder neck obstructions are due to a variety of other causes not so obvious or readily recognized, but, nevertheless, quite as important as prostatic enlargement. At least to be aware of these other causes and to appreciate their importance is essential to any degree of proper dealing with the problem of bladder neck obstruction. In the actual handling of the condition it is only by recognition of the precise nature of the responsible lesion that serious blunder is to be avoided. Certainly it is a serious blunder to remove the non-obstructing prostate of a tabetic whose retention of urine is due to central nervous system disease. Likewise, when prostatectomy is employed against an obstruction due to a sclerotic bar or contracture of the vesical neck the patient is a victim of serious blunder. Other examples might be mentioned. Appreciation of only the gross and obvious aspects of the problem presented by these conditions is quite general and but few seem aware of the remarkable refinements and methods of precision which have been brought to it by modern urology.

Any anatomic change in the structure of the bladder neck or interference with its physiologic mechanism which prevents normally free passage of urine through it constitutes a bladder neck obstruction. The condition usually results in retention of urine in some degree, though this is not a necessary accompaniment of the condition.

The following classification of bladder neck obstructions is submitted:

CLASSIFICATION OF BLADDER NECK OBSTRUCTION

I. EXTRINSIC CAUSES
  1. Bladder tumors
  2. Vesical calculi
  3. Foreign bodies

II. INTRINSIC CAUSES
  A. *Disturbances of Innervation*
    1. Central Nervous System
      a. Functional retention
      b. Diffuse lesions
      c. Localized lesions
    2. Peripheral Nerve Lesions
    3. Atony of bladder (myoneural?)
  B. *Anatomic Change*
    1. Inflammatory
      a. Cystitis vesicæ colli (female)
      b. Acute prostatitis (male)
      c. Contracture of the vesical neck
      d. Prostatic calculi
    2. Neoplasm and Pseudo-neoplasm of of Prostate
      a. Benign
        1. Lateral lobe
        2. Bar
        3. Mid-lobe
        4. Collar
        5. Albarran lobes
      b. Malignant
        1. Carcinoma
        2. Sarcoma
    3. Hypertrophy of Trigone

First of all, we may divide the conditions into those of extrinsic cause and those of intrinsic cause. The former do not involve a change of structure in the bladder neck or a disturbance of its physiologic mechanism. They are merely interferences with this mechanism by an outside cause. They are clinically important, and when the cause of obstruction is not obvious they should always come up for consideration. They are readily excluded by cystoscopy and when borne in mind present little difficulty in diagnosis. As examples of such extrinsic cause may be mentioned foreign bodies and calculi lodged in the vesical neck (Fig. 1). A recent experi-

*Presented before the Annual Meeting of the North Dakota Medical Association, Devil's Lake, N. D., May 24, 1928.

ence provides another example. The individual had partial retention of urine. On rectal examination an enlarged prostate was found. Cystoscopy disclosed a large papillary bladder tumor, attached just beyond the vesical neck and so situated that it could readily fall over and occlude the internal meatus. Following destruction of the tumor there was complete emptying of the bladder with disappearance of all symptoms, it being apparent that the hypertrophied prostate was in no way responsible.

More important are intrinsic causes. They are very often by no means obvious and frequently present difficulties which make demands on the best refinements of urologic diagnosis.

The intrinsic causes may be divided into those due to disturbances in the innervation of the bladder sphincters without any pathologic alteration of structure in the bladder neck itself, and into those where pathologic change in the vesical neck and alteration of its structure are entirely responsible. Clinically, this differentiation between disturbances of innervation and anatomic change in the bladder neck is of prime importance. It will serve no good purpose to remove a slightly enlarged, non-obstructing prostate from a middle aged tabetic whose retention of urine is due entirely to a disturbance in the innervation of his bladder sphincters. On the other hand, a tabetic with neither an enlarged prostate nor disturbance of sphincter innervation whose retention is due to bladder neck contracture may be saved from death in uremia by the very simple procedure of a punch operation.

Disturbances of innervation may be broadly divided as indicated in the classification submitted.

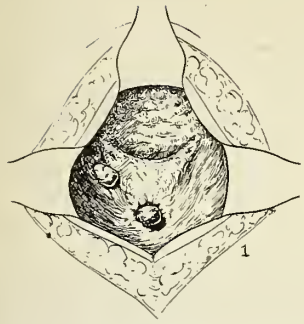
Cases of purely functional retention are by no means uncommon. In these cases there is neither anatomic change in the structure of the bladder neck nor a lesion of the neurologic mechanism controlling it. The retention is due to a purely functional disturbance of innervation. The underlying cause of most of these is obscure. Many of the so-called post-operative retentions are due more to morphine which has been given than to the operation itself. It can be shown experimentally in animals that morphine greatly increases the tone of the internal vesical sphincter and that the intravesical pressure required to make it yield is much higher than when the drug has not been given. True post-operative retention probably results from dysfunction of nerve centers concerned in the mechanism of involuntary sphincter control, and appears due to prolonged and intense afferent stimulation reaching the segment of cord in which they lie.

Retention of urine due to organic central nervous system disease is relatively common. The exact nature of the disturbance in micturition will depend on the manner in which the several factors concerned in the complex mechanism are affected. The lesion may affect either the sensory or motor path and may disturb any of the four muscles chiefly concerned: the detrusor, the trigone, the internal sphincter, or the external sphincter (Fig. 2). Tabes dorsalis is the commonest organic disease of the central nervous system producing retention. Other diffuse lesions which may be responsible are syringomyelia, encephalitis, and cerebro-spinal meningitis. Retention also occurs in certain psychoneurotic states, many of which, however, would be properly classed as functional retentions. Among the segmentally localized lesions of the cord frequently responsible for retention of urine are transverse myelitis, neoplasms, and fractures of the spine.

Peripheral nerve lesions as contrasted with central nervous system lesions, causing disorders of micturition, are seen chiefly in the results of trauma, surgical or otherwise. Incontinence rather than retention is most frequently the result. Surgical procedures in the pelvis and fractures of the pelvis injuring nerves above the triangular ligament and external sphincter may be productive of retention.

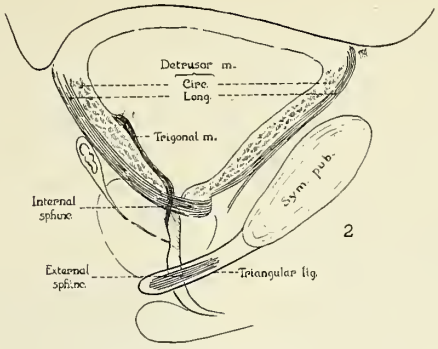
There is a condition of so-called primary atony of the bladder. The bladder muscle fibers are atrophied, the wall is of paper thinness, and there is enormous capacity. The atrophied trigone is incapable of opening the internal sphincter which though of poor tone is still competent. It seems most probable that such changes are ultimately of neurogenic origin. In the absence of other clinical evidence in support of nervous system disease the cases are designated "atony of bladder."

Obstructions due to actual anatomic change in the bladder neck constitute a large majority. These may be divided into those of inflammatory or post-inflammatory origin and those of neoplastic or "pseudo-neoplastic" origin. The particular types in each group are indicated in

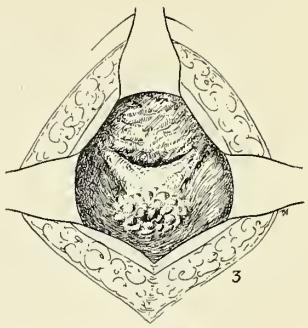


1

Bladder neck obstruction
Extrinsic cause: stone obstructing internal meatus

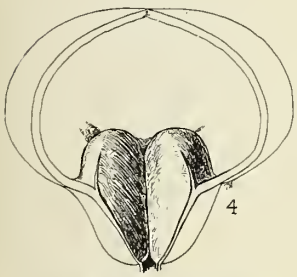


The muscles concerned in micturition



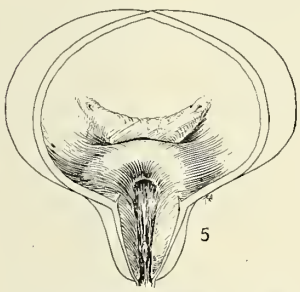
3

Acute prostatitis:
Inflammatory swelling at vesical neck



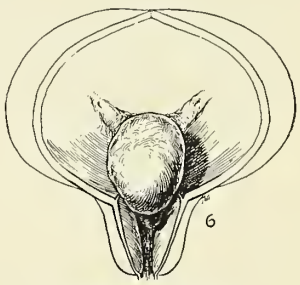
4

Benign hypertrophy of prostate:
lateral lobe enlargement



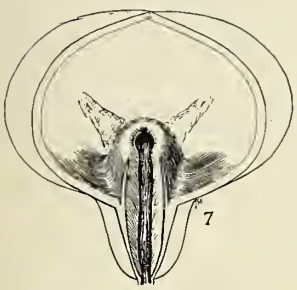
5

Benign hypertrophy (and cicatrization?) of prostate:
median bar



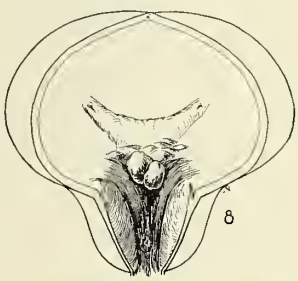
6

Benign hypertrophy of prostate:
mid lobe enlargement



7

Benign hypertrophy of prostate:
collar enlargement

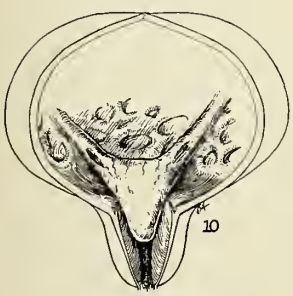


8

Hypertrophy (adenoma) of sub-trigonal glands

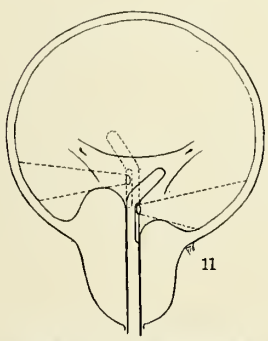
9

Neoplasm of prostate: adeno-carcinoma, extensive



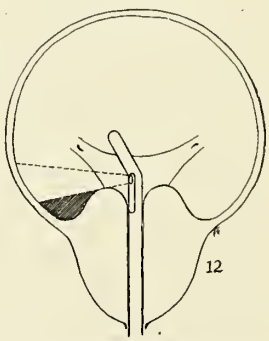
10

Hypertrophy of trigone



11

Measurement of intravesical enlargement:
Extent cystoscope is introduced to see over the projecting lobes



12

Measurement of intravesical enlargement:
the "obscured zone" of bladder wall

Figs. 1 to 12

the classification. During the acute stage of an inflammatory process the obstruction is due to edema of the mucosa and deeper structures at the bladder neck (Fig. 3). The post inflammatory obstructions result from cicatrization and contraction, the internal sphincter becoming fixed in scar and the meatus contracted. Calicification may occur in the infected prostate. Occasionally, as in the case illustrated, such stones may completely replace the gland (Fig. 13).

Hypertrophy and neoplastic disease of the prostate are the most frequent of all causes of bladder neck obstruction. Clinically they are the most obvious. For the purpose of serviceable clinical classification we may divide the benign enlargements of prostate on the basis of their gross morphologic character as indicated in the classification submitted (Figs. 4-8). Proper recognition of this is essential to selection of the surgical procedure to which the condition is best amenable.

Malignant tumors of the prostate are carcinoma and sarcoma. Carcinoma is much the more frequent, sarcoma being something of a curiosity. Carcinoma arises from epithelial elements of the prostate. Geraghty pointed out that in the usual clinical case the tumor begins in the posterior lobe. Its infiltrating growth produces a firmly fixed, dense, and irregular lamina across the posterior aspect of the prostate with infra-vesical extension in the direction of the vesicles, and obliteration of the median furrow between the two lateral lobes (Fig. 9). This character of growth distinguishes the condition from the encapsulated, globular, and smooth benign enlargements. Occasionally the tumor arises as a carcinomatous change in an originally benign adenoma of a lateral lobe. Such growths are occasionally found on sectioning removed glands which were typically benign clinically. They do not give a high incidence of recurrence but such cases do not describe the usual clinical case of carcinoma of the prostate mentioned above. Sarcoma arises from smooth muscle, is very rapid in its growth, and produces very large infiltrating growths which may fill the whole lower part of the pelvis.

Hypertrophy of the trigonal muscle is common. It occasionally reaches degrees causing obstruction. It probably represents an hypertrophy of over-use caused by bladder irritation. The anatomic result is a condition similar to prostatic bar (Fig. 10).

More rare and bizarre causes of obstruction, such as echinococcus disease of the prostate, hypertrophy of the verumontanum, and congenital valves, have not been included in the classification and are not considered.

The clinical diagnostic problem presented by

Fig. 13. Plain urinary tract x-ray, bladder region. Complete calcareous replacement of prostate. Note separation of shadow into mid-lobe and two lateral lobe portions.

these cases has two aspects: first, proper recognition of the type of bladder neck obstruction, together with exact determination of the lesion responsible for it; second, appraisal of the damage, if any, to the patient's general condition resulting from the bladder neck obstruction. As to the second aspect, only a few salient points will be mentioned. In every instance determination of blood urea nitrogen and creatinine, and phthalein excretion should be made. The presence or absence of accompanying upper urinary tract infection may be determined by examinations of ureteral catheter specimens of urine. Obstructions which have caused temporary or permanent damage to renal function are accompanied by urine of low specific gravity. The heart and vessels and blood pressure values are to be determined. Serious departures from nor-

mal are to be expected in cases of obstruction of long standing and their exact appraisal is an important item in the clinical examination of such patients.

Determination of the nature of the bladder neck obstruction and proper recognition of the responsible lesion may now be considered.

The symptoms caused by a bladder neck obstruction will, of course, be conditioned greatly by the exact nature of the obstruction and the pathologic process producing it. For this reason careful inquiry into the history is important and valuable leads for the physical examination to follow are thus obtained.

HISTORY

A history of neurologic disturbances in general should always be looked for. A marked difference in the urinary symptoms can usually be drawn between the cases due to disturbances of innervation and those due to anatomic change. Disturbances of innervation are usually accompanied by some degree of bladder anesthesia but rare lesions affecting only motor paths exhibit no anesthesia.

A history of gonorrhea or, more important, post-gonorrheal prostatitis with persisting "morning drop," perineal discomfort, et cetera, are almost regularly obtained in cases of bladder neck contracture in men. In women the similar condition has usually been preceded by oft repeated attacks of acute urethritis and "cystitis." Those due to active inflammatory change are usually marked by recent infection and their acuteness.

The typical history of gradually developing symptoms of benign prostatic hypertrophy is characteristic. The following occur in order: nocturia, increasing daytime frequency, hesitancy, diminished stream, dysuria, complete retention, overflow incontinence. However, an enlarged gland may cause no residual urine and no symptoms for a long time and then suddenly cause complete retention. Complete retention is most likely to be precipitated by some excess: over-eating, over-drinking, sexual excitement, exertion or exposure. The course of symptoms will be influenced by the presence or absence of infection and the occurrence of one of two reactions to the obstruction on the part of the bladder: hypertrophy or atony. With infection, irritative phenomena become exaggerated, there is extreme frequency, urgency, dysuria, and terminal pain. Even without infection these may occur when marked concentric hypertrophy of the bladder has been established. If the bladder reacts to the obstruction by becoming atonic, due to prolonged over-distention, the individual may become almost unaware of his trouble but for hesitancy, slight frequency, and diminished stream until complete retention occurs.

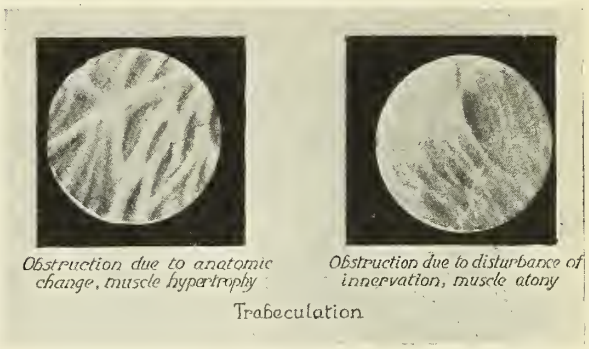

Obstruction due to anatomic change, muscle hypertrophy
Obstruction due to disturbance of innervation, muscle atony
Trabeculation

Fig. 14

With carcinoma of the prostate the usual obstructive symptoms are in the background, the condition being characterized more by dysuria, perineal pain, and pains referred to the back, pelvis, and lower extremities. Contrary to popular opinion hematuria is much more suggestive of benign hypertrophy than of carcinoma.

PHYSICAL EXAMINATION

The physical examination should disclose any of the grosser manifestations of central nervous system disease as shown by the reflexes, and coordination and sensation tests. A neurologic consultant may give valuable aid in such cases. The possibility of symptoms being due to neurologic disease must be borne in mind constantly.

It is important to determine the degree of bladder distention present and estimate the tension within it. A flaccid bladder under no tension though of enormous capacity may be emptied with impunity but not so a firm over-distended bladder under increased tension. It is much safer to gradually decompress such bladders.

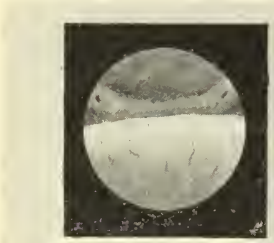
Palpation of the urethra may disclose the infected peri-urethral glands or diffuse infiltration of a chronic urethritis. These are frequently found associated with inflammatory or post-inflammatory bladder neck obstructions and should be looked for in females as well as in males.

If there is a history of gonorrhea, particularly in younger individuals, the urethra should be explored. The bougie á boule will frequently find strictures and infiltrations. The bladder neck itself normally offers little resistance to withdrawal of the bulb but a contracture may give a firm tug.

The patient's act of urination is observed. He is instructed to completely empty the bladder. In cases of obstruction there is usually some degree of hesitancy in starting the stream. The size and force of the stream are noted. Even with well developed obstructions the first part of the stream, when the bladder has tone because of its filled condition, may be of good force. An abnormally prolonged terminal decrease in force is significant. After voiding to empty, a catheter is immediately passed. The presence of residual urine is an important finding but its absence by no means rules out obstruction, for if the bladder has reacted to obstruction by concentric hypertrophy the powerful trigone may be capable of pulling open the obstructed vesical neck and the well compensated detrusor may force complete evacuation.

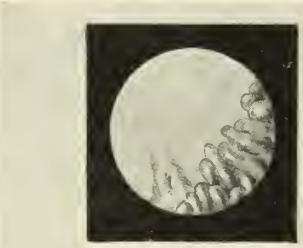
Much is learned from the rectal examination in men and vaginal touch in women. Obstructions due to cute inflammatory change produce tenderness to pressure on the prostate, and in women tenderness to pressure against the bladder neck. With the post-inflammatory contractures in women, an infiltrated urethra and palpably thickened bladder neck may be felt. This condition in men is usually associated with a small, somewhat irregular prostate which lacks the normal resilience and is well described as "gristly." There may be no palpable abnormality of the gland or only slight thickening across its base.

Benign enlargements of the prostate may be almost entirely intra-vesical and give little or no enlargement palpable by rectal examination. In most cases, however, some degree of enlargement is apparent by rectal examination. The gland is smooth, usually firm, but resilient. The globular lateral lobes form a sulcus to each side toward the pubic rami and between the two is a well defined median furrow covered by the uninvolved posterior lamina or lobe. The attachments are elastic and the gland is very slightly movable.



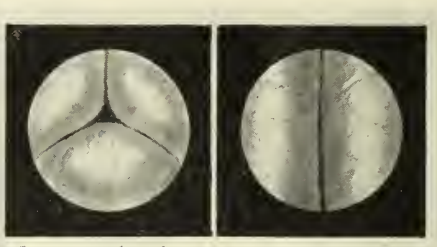
Cystoscopic view: prostatic bar

Fig. 15



Cystoscopic view: vesical neck margin; left postero-lateral segment; inflammatory swelling

Fig. 16



Lateral and mid-lobe enlargement *Bi-lateral enlargement*

Urethroscopic views: intraurethral clefts

Fig. 17

These characteristics on rectal examination usually sharply distinguish the condition from carcinoma and make of the rectal examination the most valuable item we have in differentiation of the two conditions. The typical carcinomatous gland is stony hard. The surface is irregular or even nodular. Distinct lateral lobes are not distinguishable and the median furrow between them is obliterated. The sulci between the gland and the pubic rami are filled out and obvious growth in these directions may be found. Fixation is so firm that no movement can be detected. The differential diagnosis between a carcinomatous gland and a benign enlargement in which infection and cicatrization have occurred may be difficult.

CYSTOSCOPY

The chief value of cystoscopy is in the cases without residual urine and in those without obvious benign enlargement of carcinoma. Cystoscopy is useful, too, in recognizing the intrinsic causes of obstruction and complicating

conditions such as stones, tumors, and diverticula.

On introduction of the instrument the rotation of the beak required for passing the prostatic urethra should be noted. An unusual rotation may be required in the presence of bulging lobes. The beak may catch under a bar or cicatrized posterior segment of sphincter. The elongation of the urethra can be measured. The firmness with which the sheath is held by the prostatic urethra and the extent to which its axis may be deflected is valuable information. Carcinoma and extensive cicatrization hold the scope firmly and interfere with its deflection.

Brief inspection will show the degree of atony or hypertrophy present. The atonic bladder has large capacity and is non-irritable; the hypertrophied one is often of small capacity and irritable. Either condition may result from obstruction due to anatomic change in the structure of the vesical neck but atony and large capacity speak for long duration or for a disturbance of innervation.

Trabeculation is spoken of as a criterion for recognition of the so-called "tabetic bladder." The typical cord bladder is of large capacity, atonic, and anesthetic, and exhibits a very delicate interlacing mesh of muscle bundles. This latter characteristic might be spoken of as trabeculation but it is very different from the trabeculation of hypertrophy (Fig. 14).

A systematic inspection of the bladder neck is

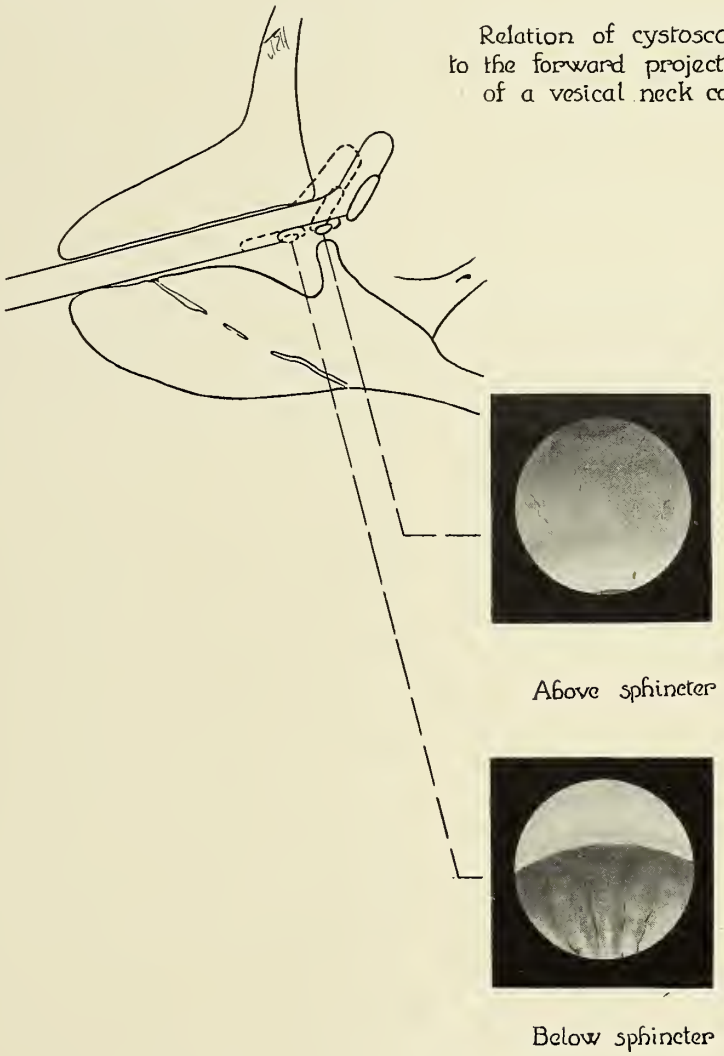


Fig. 18

made by rotating the fenestra of the instrument through its whole circumference. In so doing, the axis of the instrument should be kept perfectly straight. If there is an intra-vesical enlargement of the prostate present its extent and character can thus be determined. The degree of enlargement in the various quadrants is estimated by the distance the instrument has to be introduced to see over the summit of the projecting gland (Fig. 11). The projecting gland will cut off from vision a zone of bladder wall at the vesical neck (Fig. 12). The different lobes may be demarcated by clefts between them and the extent to which each one is enlarged thus becomes evident. From the views obtained in different quadrants a composite picture may be constructed.

A pure bar hypertrophy stands out as a prominent ridge across the posterior segment usually high enough to obscure the fore part of the trigone (Fig. 15). It blends with the lateral lobe portions to each side and unlike true midlobe enlargements there are no clefts at these points.

Hypertrophied Albarran glands may project up from the trigone or into the posterior segment without enlargement of lateral lobe portions.

It is always well to determine the extent of intra-urethral enlargement as this may be the chief factor in obstruction. The depth of the clefts between the lobes is the criterion here (Fig. 17).

The normal bladder neck presents a perfectly smooth mucosa exhibiting no edema and as the instrument is drawn into the urethra it is seen to have a gently rounded sphincter margin. In obstructions due to active inflammatory processes the mucosa is thrown into polyp-like folds by edema, it is reddened, appears spongy, and bleeds readily (Fig. 16). The same changes, lacking only the intense hyperemia of the acute process, are seen in the chronic infiltrating urethritis and "cystitis vesicæ colli" of females.

Contracture of the vesical neck may be very difficult to recognize (Fig. 18). The bladder neck is perfectly flat and no zone of bladder wall is obscured. The sphincter margin which should be gently rounded is acute and hugs the instrument closely. A narrow rim-like elevation can sometimes be made out just at the margin of the meatus. On drawing the instrument down into the urethra it is possible to look back into the floor of the urethra under a forward projecting web of posterior bladder neck. In this condition the patent orifices of stiff and sclerotic prostatic ducts, the result of an old prostatitis, are frequently seen.

With disturbances of innervation a pronounced relaxation of the internal sphincter frequently occurs. No sphincter margin can be made out and the bladder neck appears as a funnel with posterior urethra and bladder in open communication.

By critical attention to the facts of a well taken history, by careful appraisal of physical findings with especial reference to the urinary tract, and finally by the findings of a competent cystoscopy it is almost invariably possible to positively and correctly assign the cause of trouble. Only when this has been done can intelligent and proper treatment be undertaken. To proceed otherwise is to subject the patient to the risk of serious blunder.

DISCUSSION

Dr. V. J. La Rose (Bismarck, N. D.): Dr. Foley in his excellent paper has so well covered all the causes of obstruction of the bladder neck that anything I could say would be superfluous.

I wish to call attention, however, to a few conditions the general practitioner meets with in acute retention. Obstruction is the prime factor in retention at the bladder neck. There may be obstruction but if there is no retention of urine it is not nearly as serious as when the retention develops with back pressure on the kidneys, which interferes with their function to a greater or lesser degree. The relief of acute retention is a problem for the general practitioner, for many men who are doing general work are called in to take care of cases of acute retention as an emergency, and it is well to bear certain points in mind.

The relief of acute retention, to my mind, is always a serious problem. While there are conditions in which retention may be relieved by emptying the bladder completely by catheterization, there are other conditions in which sudden or even partial emptying of the bladder is serious, and sudden death has occurred in these cases. As Dr. Foley brought out, the history and physical examination are very important. In males in the forties who have a history of infection, gonorrheal or what-not, with prostatitis, the condition will usually be one not of hypertrophy of the prostate but of contraction of the bladder neck due to the infiltration following the long continued infection, while in the fifties and sixties and so on the retention is more likely to be due to enlargement of the prostate.

We should not forget, as Dr. Foley also emphasized, that we have these bladder neck obstructions in the female as well as the male. We must not overlook these. In cases of acute obstruction in which you attempt to pass a catheter, if obstruction is due to a nerve lesion there is usually not much trouble in catheterizing, owing to anesthesia of structures at the bladder neck. In malignant conditions and hypertrophy of the prostate there will sometimes be great difficulty in passing a catheter, and the patient will often complain very bitterly. In this way we can form an opinion as to the existing cause of obstruction. We should be careful not to traumatize the urethra. If the catheter does not pass easily we should not force it in, for sometimes we make a bad matter much worse.

I think the safest procedure in emptying the bladder, if you are successful in passing the catheter, is to leave it in, fasten it with adhesive strips, and gradually empty the bladder. You can put a little plug in the end of the catheter and advise the attendant to draw off a small medicine glassful of urine every hour or so, or allow it to drip slowly, and in that way gradually empty the bladder. The most dangerous case is usually that of a man who gives a history of gradually oncoming trouble, difficulty in passing urine, the stream becoming smaller, and so on. These patients usually carry more or less residual urine, resulting in increased pressure in the kidneys, and sudden relief sometimes works great harm, even to the onset of uremia with a fatal outcome.

Dr. Foley (closing): I am most appreciative of Dr. La Rose's discussion. Attention was called to the use of the indwelling catheter for constant drainage. Dr. La Rose advised leaving the catheter in place the first time it is inserted, particularly in cases where its passage is difficult. Keeping an indwelling catheter fixed in the urethra is often a difficult matter. If it is causing irritation the uncoöperative patient will pull it out; disoriented patients almost regularly do so. A redundant prepuce, phimosis, balanitis, et cetera, may make the usual fixation with adhesive impossible under any of these circumstances. A trick procedure which I recently devised may be employed with assurance that the catheter will remain fixed in place and that the patient can not remove it. It is best to use an old catheter which has been softened by repeated boiling: It is passed in the usual way and advanced well up into the bladder. The penis is retracted back along the shaft of the catheter, the latter being held in place by pressure with the thumb in the perineum against the pubic arch. The catheter is then cut across at the meatus. As the retracted penis is released the end of the catheter slips up some distance in the pendulous urethra. The urine is allowed to drain from the meatus into a urinal placed between the patient's thighs.

PRELIMINARY REPORT OF A NEW AND SIMPLE TECHNIC FOR LIPIODOL INJECTION OF THE UTERUS*

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and
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DURING the past two years lipiodol has been rather frequently used at this hospital as an aid to establishing the diagnosis in doubtful female genital conditions. Cases have been carefully selected before injection of the iodized oil into the uterine cavity and patients with acute inflammatory disease are never subjected to the procedure, but rather those with chronic complaints in whom pelvic pathology is either not demonstrable or the degree uncertain upon bimanual examination. Certain other cases, such as patients complaining of sterility and some with uterine myomata, have been subjected to the test merely to demonstrate, if possible, patency of the Fallopian tubes in the former and encroachment upon the uterine cavity in the latter, if the myomata be of the submucous type.

Fig. 1. Roentgenogram showing old technic with speculum, tenaculum and canula in place. Upper border of uterus distorted by tip of canula. Complete occlusion of tubes.

Fig. 2. Roentgenogram showing new technic with no instruments except retention catheter in place. Normal patent Fallopian tubes.

Variations in technic of this simple operation have been described by others from time to time. Simplicity is the end toward which we have striven.

The first method employed by us was more cumbersome than that now used. The operator exerted some traction upon a tenaculum placed in the anterior lip of the cervix while a Rubin's canula, the tip of which, up to the rubber stopper, was inserted into the cervical canal and pressed upon firmly from below. By this combined traction on the cervix and pressure upon the canula to hold the stopper tightly in the cervical os, all backflow of lipiodol into the vagina was prevented. The roentgenograms taken following

*From the Obstetrical and Gynecological Service of the Minneapolis General Hospital.

the injection of the lipiodol into the uterine cavity showed both the canula, tenaculum, and speculum as well as the distribution of the lipiodol. Not only were these instruments superfluous when seen in the *x*-ray plates but occasionally one saw the contour of the uterine cavity distorted by the tip of the canula (Fig. 1). This was particularly true when the depth of the uterine cavity was shorter than normal and in uteri where a marked anteflexion was present.

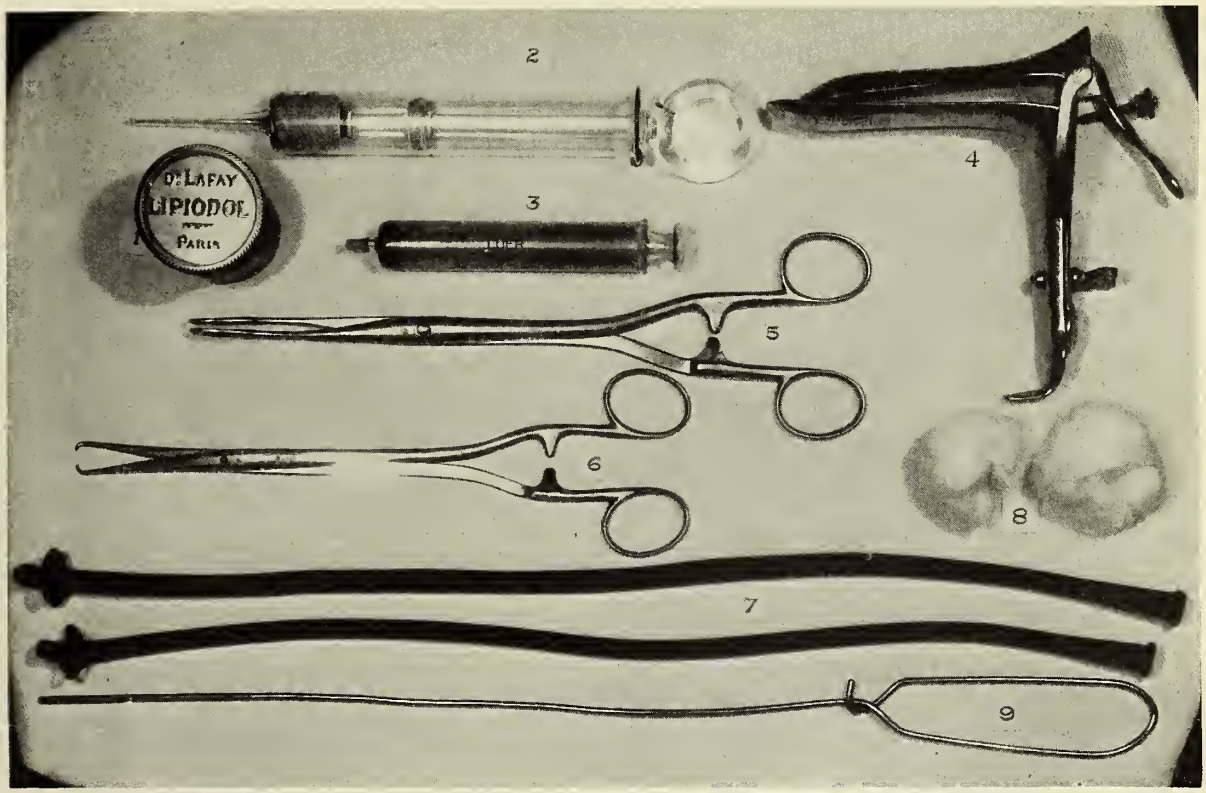

Fig. 3. Tray completely set up for lipiodol injection of uterus by the newer method. 1. Dr. LaFay's lipiodol. 2. Triumph syringe. 3. Luer syringe, 10 c.c. 4. Graves' speculum. 5. Sponge forceps. 6. Tenaculum. 7. Retention catheters. 8. Cotton balls. 9. Mandrin.

The technic we now follow permits us to discard all accessories to the operation itself before the roentgenogram is made. Rubin's canula is no longer used. Instead, a rubber mushroom or retention catheter is inserted into the uterus by means of the regular mandrin used for insertion of retention catheters in urologic practice. The anterior lip of the cervix is held with a tenaculum for convenience while placing the catheter, but is released before the *x*-ray exposure is made. The catheter is then drawn down so that the bulb, or mushroom tip, rests firmly over the internal os. Lipiodol is then injected and the plates made (Fig. 2).

This method requires less time and gives equally as good results in most instances without the instruments being shown in the *x*-ray plates. In a few cases there has been a small reflux of lipiodol along the sides of the catheter into the vagina, but this occurs only in cases of multiparous women with more or less patulous cervices and has been noted also in similar cases where the technic employing the canula has been used. This condition may, however, be more easily avoided in this newer method described by simply selecting a catheter of caliber suitable to the degree of patency of the external os and cervical canal.

SUMMARY AND CONCLUSIONS

1. The method of employing retention catheters instead of a canula in lipiodol injections of the uterus simplifies the technic.

2. The contour of the uterine cavity is often distorted by the tip of a canula in acutely anteflexed uteri and in those which are smaller than normal.

3. Instruments are not visualized in the hysterogram to interfere with the more accurate

reading of the conditions represented in the picture.

4. A retention catheter is more easily accessible than a Rubin's or similar canula and therefore makes the procedure available to a larger number of physicians for aid in gynecologic diagnosis.

5. A tenaculum, retention catheter and a mandrin for the catheter are the only equipment necessary besides a speculum and syringe.

NARCOSAN AND DRUG ADDICTION

Narcosan is the "discovery" of one A. S. Horowitz, who came to the U. S. in 1913 and has been more or less continuously indentified with attempts to promulgate cures for all sorts of disorders. There was the Horowitz-Beebe treatment for cancer, known as "Autolysin," there were the Merrell Proteogens for the treatment of practically everything, and, finally, there was Narcosan, originally brought out about 1920 under the name "Lipoidal Substances." Lipoidal Substances was not accepted by the Council on Pharmacy and Chemistry, because it was of unestablished composition and the clinical reports were not convincing. In 1926 an article appeared on the subject of Narcosan, which paper had previously been rejected by The Journal of the American Medical Association. Since then sensational newspaper articles about Narcosan have appeared. Now a preliminary report of the Mayor's Committee on Drug Addiction of the City of New York has been published. It is signed by the chairman of the committee, Dr. Alexander Lambert, who was one of the authors of the favorable report on Narcosan published in 1926. The committee report is summed up in the closing clause: "Narcosan has no merit as a specific treatment of drug addiction." (Jour. A. M. A., January 12, 1929, p. 151.)

MORE INFLUENZA VACCINE PROPAGANDA

As might have been expected from previous activities of the firm, among the earliest to enter the field in an endeavor to promote vaccine products during the current influenza epidemic has been the G. H. Sherman Company of Detroit. In 1924 the Council condemned the firm's influenza vaccine, particularly because of lack of evidence in its support, and all of the mixed vaccines in general because their use is not in the interest of sound therapy and public health. The more recent literature circulated by Sherman includes the claim that records of Dr. Don C. Sutton, Frederick Tice, Alexander Lambert and William O'Neill Sherman constitute suitable evidence in support of the use of the prophylactic vaccine against this disease. Letters from Drs. Sutton and Sherman cast considerable doubt not only on the statistics and statements cited by G. H. Sherman in support of the use of his preparations but also on the right of that concern to use the material in advertising. For some years the products of G. H. Sherman have not been advertised in any of the publications of the American Medical Association and none stand accepted for New and Non-official Remedies at the present time. (Jour. A. M. A., January 26, 1929, p. 316.)

A REPORT ON FISHES FROM THE MISSISSIPPI RIVER AND OTHER WATERS WITH RESPECT TO INFESTATION BY *DIPHYLLOBOTHRIUM LATUM**

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IT has been demonstrated conclusively that the larvæ of *Diphyllobothrium latum* frequently occur in the flesh of certain game fishes taken from three lakes in northern Minnesota (Magath, 1927). Consequently, it is of importance to determine the degree and extent of infestation of fishes from all waters of Minnesota and adjoining states. I am, therefore, reporting data concerning fishes from the Mississippi River, taken between St. Paul, Minnesota, and LaCrosse, Wisconsin, the St. Croix River, Lake Mazaska (near Faribault, Minnesota), and Long Lake (near Ely, Minnesota). This is the first of a series of reports to be made dealing with this phase of the problem of the broad fish tapeworm.

The flesh of each fish was removed, cut in pieces of convenient size, and flattened between two pieces of plate glass. By means of transmitted light any larvæ present in the flesh could readily be detected. The results of the study are given in Table I.

The record in Table II, of infestation recently observed in Long Lake, is in striking contrast with the negative data just recorded.

The number of larvæ in these fishes ranged from eleven to sixty.

From these data it may reasonably be concluded that fishes from the Mississippi and its tributaries in this region are seldom, if ever, infested with the larvæ of *D. latum*. In my opinion it is not necessarily the failure of the ova of the parasite to reach these rivers, but rather the absence of the proper first intermediate host that may account for the lack of infestation among the river fishes. *Diaptomus oregonensis*, which acts as the first intermediate host of *D. latum* in Long Lake, is typically a lake form, as are most of the members of the genus. Those species of Cyclops which are more or less abundant in the rivers of this region fail to become infected with the oncosphere of *D. latum* (Essex, 1927). In view of these considerations it would

TABLE I

Fish	Size, cm.	Number examined	Source
Esox lucius (pickerel)	10 to 45	43	Mississippi river
Stizostedion vitreum (wall-eyed pike)	70	2	Mississippi river
Perca flavescens (yellow perch)	7.5 to 30	46	Mississippi river
Lepomis pallidus (bluegill)	10 to 12.5	2	Mississippi river
Ami calva (bowfin)	60	1	Mississippi river
Minnows	5 to 7.5	8	Mississippi river
Esox lucius	20 to 35	5	St. Croix river
Stizostedian vitreum	20 to 35	8	St. Croix river
Perca flavescens	15 to 20	4	St. Croix river
Micropterus salomoides (black bass)	20 to 25	3	St. Croix river
Perca flavescens	7.5 to 10	25	Lake Mazaska
Esox lucius	40 to 75	26	Spring Lake Park Rapids, Minnesota
Perca flavescens	7.5 to 22.5	48	Spring Lake Park Rapids, Minnesota
Total		221†	

TABLE II

Fish	Size, cm.	Number examined	Source	Number infected	*Diphyllobothrium latum* larvæ
Esox luscius	55 to 75	5	Long Lake	5	181

*From the Division of Experimental Surgery and Pathology, The Mayo Foundation, Rochester, Minnesota.

†Larvae of *Diphyllobothrium latum* were not found in any of the fishes examined.

be surprising to find a river fish infected with this parasite.

This report was made possible by the splendid coöperation of Mr. Canfield, U. S. Bureau of Fisheries, La Crosse, Wisconsin, and Mr. T. Surber, Minnesota Fish and Game Commission, St. Paul.

BIBLIOGRAPHY

1. Essex, H. E.: Early development of *Diphyllobothrium latum* in northern Minnesota. Jour. Parasitol., 1927, xiv, 106-109.

2. Magath, T. B.: Experimental studies on *Diphyllobothrium latum*. Preliminary report. Minn. Med., 1927, x, 614-616.

SEMAFOR, A DENTOMEDICAL NOSTRUM

The Indicator Laboratories, Inc., Chicago, put out a preparation, "Semafor" that, it is claimed, "combats unpleasant Breath (Halitosis), Acidity, Mouth Infections (Sepsis), and Tooth Decay, by its Cleansing, Healing, Germicidal Action—and removes sticky film." Semafor is described as the "New *Red* Purifier that turns *White* when disorders lurk in mouth and throat." According to the analysis of the chemist of the American Dental Association Semafor is nothing more than a simple saline solution to which a little alcohol, sodium carbonate and an indicator in the form of phenolphthalein have been added. The selling point of Semafor is that of getting the public to believe that, if the diluted pink Semafor solution, when put in the mouth, is partially or wholly decolorized, the user is suffering from "acid mouth." The fact that normal saliva from perfectly healthy mouths is faintly acid in reaction makes it obvious that the vast majority of people who would use Semafor would find this solution partially decolorized. They will also find, as a matter of course, that if, at the time of using Semafor, they repeatedly rinse their mouth with this alkaline solution, with each rinsing the solution that is ejected will be nearer the normal Semafor solution color. This will further convince the public that their mouths are being "disinfected" although, of course, the product is not a germicide. (Jour. A. M. A., January 5, 1929, p. 73.)

"INFLUENZA SEROBACTERIN MIXED"—A REVIVAL

In 1918 the Council on Pharmacy and Chemistry denied admission to New and Non-official Remedies of "Influenza Serobacterin Mixed-Mulford," holding that there was no evidence for the value of the mixture and that its use was illogical. Since then nothing has happened to question the soundness of this judgment of the Council. Nevertheless, a circular letter sent to a large industrial concern conveys the impression that "Influenza Serobacterin Mixed" is an effective means of checking influenza and of treating respiratory infections. The apparent conviction by the promulgators of "Influenza Serobacterin Mixed" of the value of their preparation is not the slightest guarantee of their truth. This is merely an ill considered crude revamping of old notions and phrases, surviving in discredited advertising matter, and now revived during a period of public fears in time of epidemic (Jour. A. M. A., January 19, 1929, p. 233).

ACTEROL

Acterol (a preparation containing irradiated ergosterol), it is reported, has been withdrawn from the market by Mead Johnson & Co. until such time that further animal and clinical experimental studies shall have determined its therapeutic status. (Jour. A. M. A., January 12, 1929, p. 170.)

OBSERVATIONS ON THE USE OF POTASSIUM SULPHOCYANATE (RHODAN) IN THE TREATMENT OF ESSENTIAL HYPERTENSION*

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WHILE in Germany in 1926 I was so impressed by the results that were being obtained at the clinics there by the use of rhodan (potassium or sodium sulphocyanate) in essential hypertension, that I determined to give it a trial as soon as I should return home. On looking up the literature I found very few articles by American authors, most of them being by Germans.

The earliest experiments with rhodan seemed to have been undertaken by Paul[1] in 1903 with favorable results. He assigned to rhodan a sedative quality and an ability to lower blood pressure. He reports his results in the treatment of thirty-five clinical cases with one gram of sulphocyanate daily. He found the drug to exert a very satisfactory sedative action on the pain, vertigo, restlessness, insomnia, irritability, fear, palpitation, increased reflexes, tremors, etc., of neurasthenic conditions, cardiac neuroses, climacteric neurosis, tabetic pain, syphilitic headaches and similar conditions. In another class of cases exhibiting arterial hypertension, Pauli obtained marked reduction of blood pressure with relief of vertigo and other subjective symptoms. He noted various analogies between the action of iodides and sulphocyanate, even to the occurrence of a sulphocyanate acne and rhinitis. Among other things he noted the use of iodides to promote elimination of earthy salts and suggests that the beneficial action of the iodides and sulphocyanate in arteriosclerosis may be due to their power to remove calcareous deposits in the arteries.

In this country LeRoy and Bently[2] in 1908-1909 claimed that the sulphocyanates exert a solvent and eliminative action on the earthy salts, which action might be counteracted by excess of ammonia. On this basis they advocated the therapeutic use of sulphocyanate for the removal and elimination of calcareous and similar deposits in various degenerative conditions. These authors have used sodium sulphocyanate in the treatment of arterial hypertension with most satisfactory results.

Westphal,[3] at the Von Bergmannschen Klinik, has carried on extensive biological and clinical investigations on the use of rhodan compounds in cases of genuine hypertension, and reports very favorable results. Therapeutic tests with doses of rhodan of about 1.5–2 grams per day caused lowering of the arterial tension in 75 per cent of the cases treated. These larger doses proved unsatisfactory as they were associated with symptoms of intoxication of an inflammatory nature, with agitation, delirium resembling a psychosis, and great muscular weakness and fatigue. After extensive therapeutic experimentation, the proper dose was finally found to be one-tenth to four-tenths of a gram a day of potassium or sodium rhodanate. These doses did not cause such a distinct lowering of the blood pressure but the fluctuations of pressure, which are the chief factors causing complaints in hypertonia and which cause apoplexy, become much less frequent and intensive. The dangerous angiospastic condition of the brain expressed by transitory paralysis, severe vertigo, often associated with unconsciousness, in short, all the precursors and immediate causes of the apoplexy disappeared by treatment with small doses of rhodan energetically continued for some time. Very few of his cases proved to be refractory. The dosage was finally arranged in the following way: The first week 0.1 gram three times a day, second week 0.1 gram twice a day, and the third week 0.1 gram once daily, when the treatment was discontinued for one week, and then a new course started. In case of fatigue or weakness, the administration was discontinued for one day or the dose was reduced. Sodium or potassium sulphocyanate were used. The author also speaks favorably of rhodapurin, a proprietary preparation in candy tablets, in which the good effects of small rhodan doses are combined with the vasal dilating effect of caffeine. He finds rhodan ther-

*Read before the Minnesota Society of Internists, May 5, 1928, Duluth, Minn.

apy contraindicated in serious diseases of the kidney, serious decompensation of the heart and inflammatory diseases, such a pneumonia, bronchitis, tuberculosis, etc., as there is an increased danger of rhodan poisoning. He concludes that the results with rhodan were more satisfactory than those with the usual bromine preparations, iodine, nitrites, calcium, atropine and the endocrine substances.

Kramer[4] reports satisfactory results by the long continued administration of rhodan compounds in 70 cases of genuine hypertension. The blood pressure was often decreased from 50 to 60 millimeters. With the exception of those patients showing injury to the renal tissue, and those showing serious cardiac decompensation, his patients reacted rapidly to the drug and the result was lasting. He continued the use of the drug in ration doses for months without observing unfavorable reactions.

Gager[5] in this country reports thirty-five patients with essential hypertension that have been treated at the Cornell Clinic, only three of which entirely resisted the blood pressure reducing effects of sulphocyanate. In twenty of the group of twenty-five patients who have been under observation for several months there had occurred an individual fall in the blood pressure from 20-60 points. There had been less marked but definite lowering of the diastolic pressure. Most of the patients express a feeling of betterment after reduction of the pressure by this drug. In some cases the results came quickly, while in others a more prolonged course had to be given. In two of his patients the drug rash appeared similar to that of iodide. He gives the contraindications as acute inflammations of all types and marked renal insufficiency

Takacs[6] highly recommends the use of rhodan as a means of lowering the blood pressure. He conducted experiments which show that the maximum effect is usually reached within 45 to 60 minutes and maintains its highest point for three hours, but by systematic administration one may observe results slightly better than those observed after the single administration. He also reports a case of cutaneous eruption of a papular type after giving one gram daily for nine days. The eruption disappeared in one week after discontinuance of the drug.

The pharmacologic and therapeutic properties of the sulphocyanates have been thoroughly dealt with by Nichols[7] in 1925, to which paper I refer you for details. Time will allow me merely to mention the more important ones. As has been long known, sulphocyanate of sodium or potassium occurs normally in the saliva, tears and gastric juice. The mode of this formation has not been completely worked out. It is generally supposed to result from the katabolism of the sulphur-containing proteins and can be formed mainly in the salivary glands, from which it is secreted into the saliva and then swallowed and absorbed into the system. In this manner 0.1 of a gram is swallowed daily. It increases the flow of gastric juice.

Ingested sulphocyanates are excreted as such by the kidneys and are demonstrable in the urine of persons taking the drug. Their excretion takes place very slowly. After discontinuing the ingestion of the drug, the urine does not become free of sulphocyanate until after a number of days. This suggests the possibility of an accumulation of the drug in the system. During the ingestion of sulphocyanate the amount secreted in the saliva increases over the normal and persists for some time after its discontinuance, and this increase in the saliva persists for some time after it has disappeared from the urine. Sulphocyanates therefore pass through the organism unchanged and do not undergo transformation into the deadly hydrocyanic acid and cyanids. In large doses sulphocyanate is a powerful poison and exerts a very potent effect as a direct muscle poison abolishing muscular activity.

The consensus of opinion is that the effects of the drug are due to the sulphocyanic radical. The sulphocyanate of potassium has been generally regarded as more toxic than that of sodium, but Nichols[7] does not know of any comparative study demonstrating this. The minimum lethal dose of sodium sulphocyanate for a medium sized man of weight 70 kilos (154 pounds) would be from 15-30 grams given at one time.

Nichols[7] reports favorable results from the use of sodium sulphocyanate in nine out of twelve cases. The use of the drug in these three cases was really contraindicated as one had a serious nephritis and the other two showed serious cardiac lesions. The reduction of the blood pressure in the other nine cases varied from 50 to 100 points, the reduction appearing soon in some of the cases while in others only after prolonged administration of the drug. He feels that sodium

sulphocyanate is one of the best remedies available in the treatment of hypertension.

SUMMARY OF CASES

My experience with the sulphocyanates results from the use of potassium sulphocyanate in twenty-four cases of essential hypertension, or so-called hyperpiesia. In most cases the patients were ambulatory, and blood pressure readings were taken at the office under the same circumstances as far as possible, namely, having the patient always in a sitting position and resting from 5-10 minutes before the initial reading was made, then resting for another 5-10 minutes when the second reading was made, and the average of the two taken as the blood pressure for that day. Where undue physical or psychical disturbances occurred on any certain days, it has been noted in the record. All patients were placed at once on a moderately low protein and salt diet. (In several cases the urine was checked for total chlorides and they were never found to be below 5 grams, so I do not believe the reduction of salts has had any particular effect on the blood pressure if I am to believe what Allan states in his studies along this line. In fact, I have found it almost impossible even under hospital conditions to get the salt in the urine below 0.5 gram, which is a figure that Allan has set before a definite drop in blood pressure can be expected.) Favorable reduction of the blood pressure resulted in twenty-one cases; only two cases seemed to be refractory to the drug and little or no decrease in blood pressure was obtained after giving the drug a fair trial. One patient showed a good drop in blood pressure after taking the medicine for a week, but the drug had to be discontinued because of extreme nervousness, and weakness. The greatest reduction in the blood pressure was 110 points systolic, the least 10 points; the greatest diastolic drop was 50 points, and the least 0 points. The average reduction was systolic 50 points. diastolic 25 points. Most of the patients showed the highest reading on the first visit—probably due to nervousness.

REPORT OF THIRTEEN CASES

Case 1.—Mrs. C. M. Age 55. Diagnosis: 1, Hyperpiesia; 2, Hypertrophied heart; 3, Auricular flutter.

This patient came to the office with a blood pressure of 220/140. One week later she developed auricular flutter which disappeared under quinidine therapy at hospital. Digitalis was given along with the potassium sulphocyanate until the heart was fully compensated. Sodium iodide or potassium-iodide-theocaline tablets (Bilhuber) were alternated with the sulphocyanate solution as chart indicates. (Dotted lines indicate time of unreliable or no blood pressure readings.) Blood pressure came down to an average of 144 systolic and 88 diastolic while on ration doses of potassium sulphocyanate.

Case 2.—Mrs. D. W. G. Age 44. Diagnosis: Hyperpiesia.

This patient came to my office with a blood pressure of 180/100. Under sodium iodide, blood pressure remained the same for three weeks, and then increased to 190/120, at which point potassium sulphocyanate was given and the blood pressure steadily dropped to 128/80 in two months. The patient felt so well at this time that she thought she needed no more treatment and did not return for two months, having been without treatment of any kind during this time. I found her blood pressure to be 180/110. Potassium sulphocyanate for two weeks brought the blood pressure down to 144/84, then it was stopped and sodium iodide again given, under which the blood pressure again ascended to 180/100. This patient always feels better while taking potassium sulphocyanate and it has never failed to reduce her blood pressure and keep it down when she remains on ration doses. (See Chart 1.)

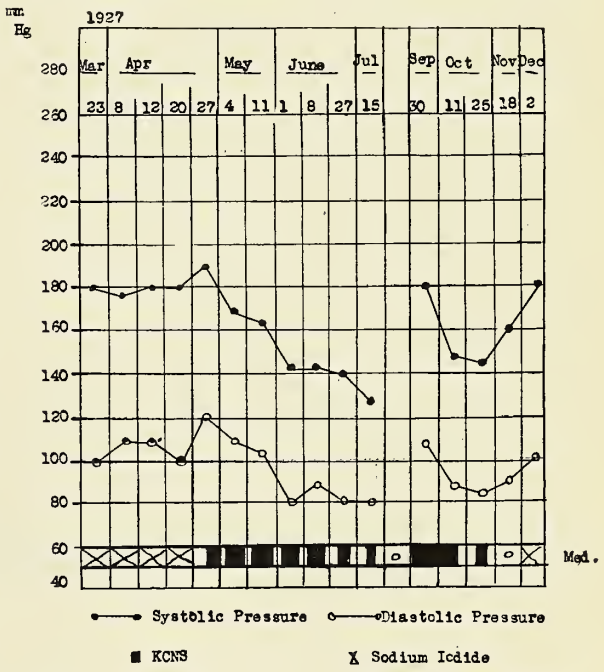

Chart 1. Case 2. Mrs. D. W. G. Age, 44. Diagnosis—Hyperpiesia.

Case 3.—Mrs. A. T. Age 54. Diagnosis: Hyperpiesia, with typical hypertension type heart.

Patient came to me with a blood pressure of 255/120. Under rest, diet and sodium iodide the pressure came down and remained at an average of 180/95 from February to July, 1926. She was not seen again until February, 1927, when the blood pressure was 200/90.

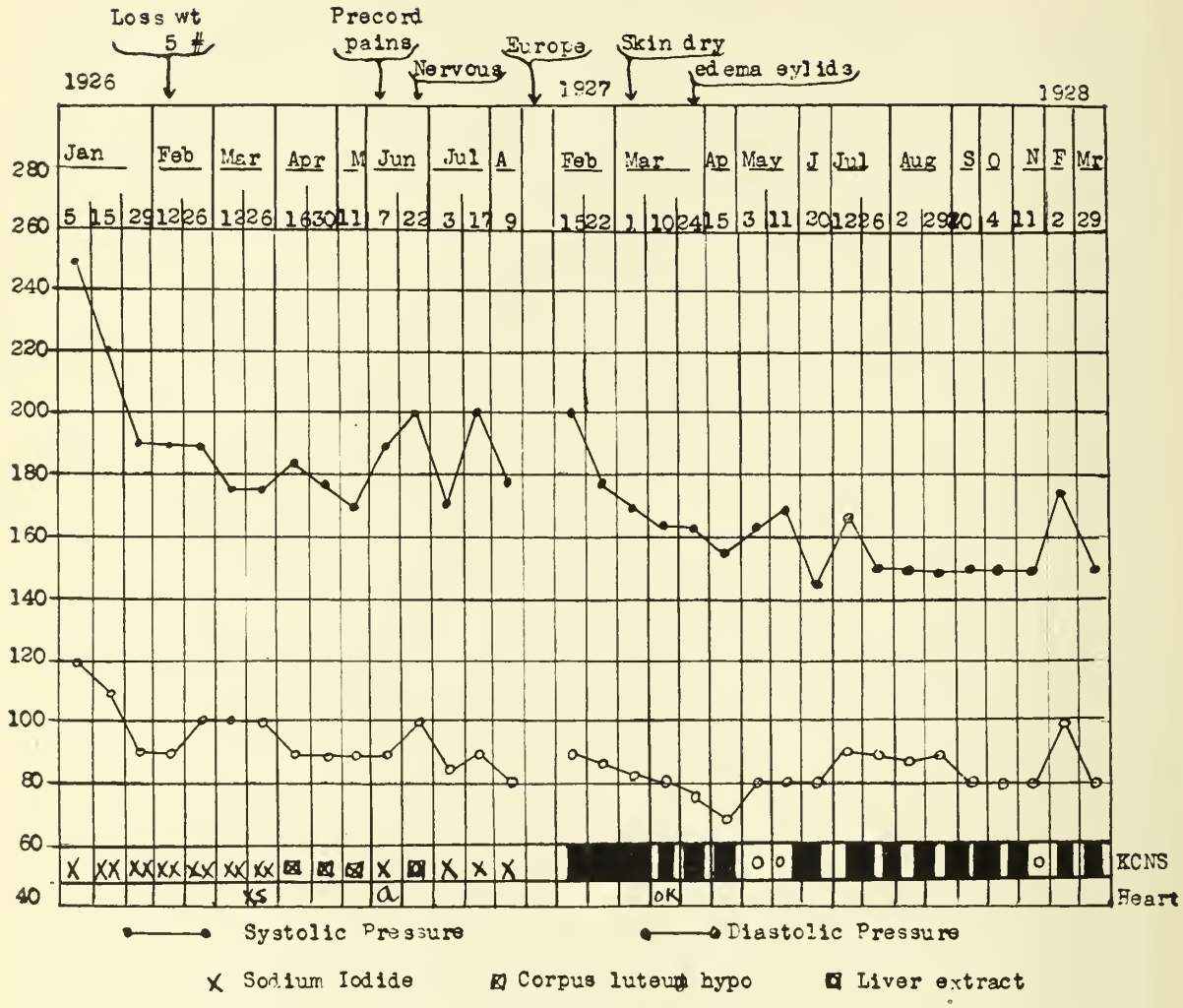

Chart 2. Case 3. Mrs. A. T. Age, 54. Diagnosis— Hyperpiesia, Typical Heart.

Under potassium sulphocyanate the pressure came down to an average of 150/84, where it remained for a year on ration doses of this drug. In 1927 corpus luteum extract was given hypodermically because of the annoying symptoms of menopause, without affecting the blood pressure. In 1928, two short courses of liver extract were given without noticeable effect upon the blood pressure. During the past six months this patient has been able to keep her blood pressure always below 170 systolic on ration doses of potassium sulphocyanate. (See Chart 2.)

Case 4.—Mrs. J. T. J. Age 63. Diagnosis: 1, Hyperpiesia; 2, Neurosis.

This patient came to the office with a blood pressure of 235/100, and during the year 1926 had an average blood pressure reading of 184/96 while on lipiodine tablets and bromides. Beginning in March, 1927, potassium sulphocyanate was given until September, during which time the average blood pressure reading was 160/90. The patient was feeling fine. (See Chart 3.)

Case 5.—Mrs. F. L. H. Age 69. Diagnosis: 1, Hyperpiesia; 2, Moderate arteriosclerosis; 3, Typical hypertension heart with some evidence of myocardial changes.

This patient came in with a blood pressure of 225/120. She stated she had been under the care of an internist for the past two years, during which time the blood pressure had never been found below 190. Under rest, diet and sodium iodide, pressure came down to 190/100, where it remained stationary for two weeks, when potassium sulphocyanate was started. The blood pressure dropped to 130/70, when this drug was discontinued. Blood pressure again went to 170/90 but came down again to 142/78. Blood pressure always remained at about an average of 160/85 while on potassium sulphocyanate and at 190/105 while on other forms of treatment. When the drug was continued in full doses for more than two weeks, the patient usually complained of weakness and slight diarrhea, but she did well on ration doses of the drug.

Case 6.—Mrs. E. K. N. Age 61. Diagnosis: 1, Hyperpiesia; 2, Angina pectoris.

This patient was first seen in 1922 when only one

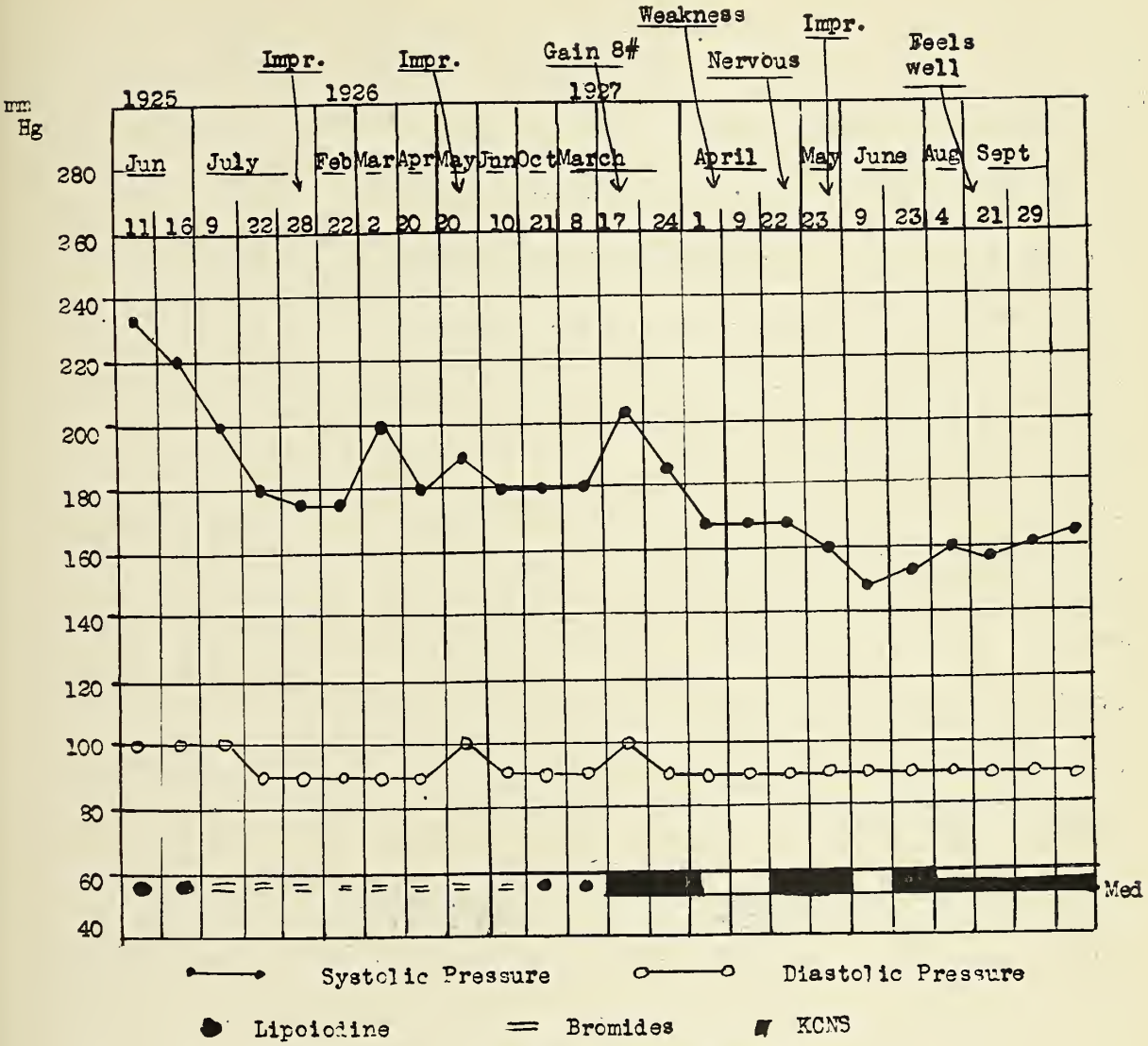

Chart 3. Case 4. Mrs. J. T. J. Age, 63. Diagnosis— Hyperpiesia, Neurosis.

blood pressure reading was made, 240/110. She was again seen in January, 1927, when blood pressure was 224/90. She was sent into the hospital and was in bed for three weeks receiving potassium iodide. The average blood pressure during this time was 197/90. The lowest reading was 190/90. She left the hospital on March 3, when her blood pressure was 200/100 and was given a bottle of 8 per cent potassium sulphocyanate to take home with her with instructions to take a teaspoonful in a whole glass of water three times a day. She reported one week later, when her blood pressure was 150/90, complaining of being a little weak. One week later it was 128/80. The medicine was then discontinued and during the next three weeks the blood pressure gradually rose to 170/80, when the potassium sulphocyanate was started again, this time being given only four days a week. The blood pressure steadily dropped and a month later was 120/80. At this point the drug was again discontinued and in the course of the next two or three weeks again rose to 160/90. During the period when she was not getting the potassium sulphocyanate, she was given some form of iodide, or bromides when nervous. If the blood pressure was down for two or three weeks and she was only given ration doses of the sulphocyanate, she felt much better and her heart functioned better. (See Chart 4.)

Case 7.—Mrs. N. H. Age 60. Diagnosis: 1, Hyperpiesia; 2, Chronic alcoholism.

First blood pressure reading Oct. 15, 1927, was 160/90. Under sodium iodide it rose to 180/100. Under potassium sulphocyanate in the course of three weeks it came down to 120/70, after which patient was lost track of.

Case 8.—Mrs. C. H. Age 39. Diagnosis: Hyperpiesia.

This patient came in with a blood pressure of 190/100. On potassium sulphocyanate it came down to 120/80. The drug was discontinued and the blood pres-

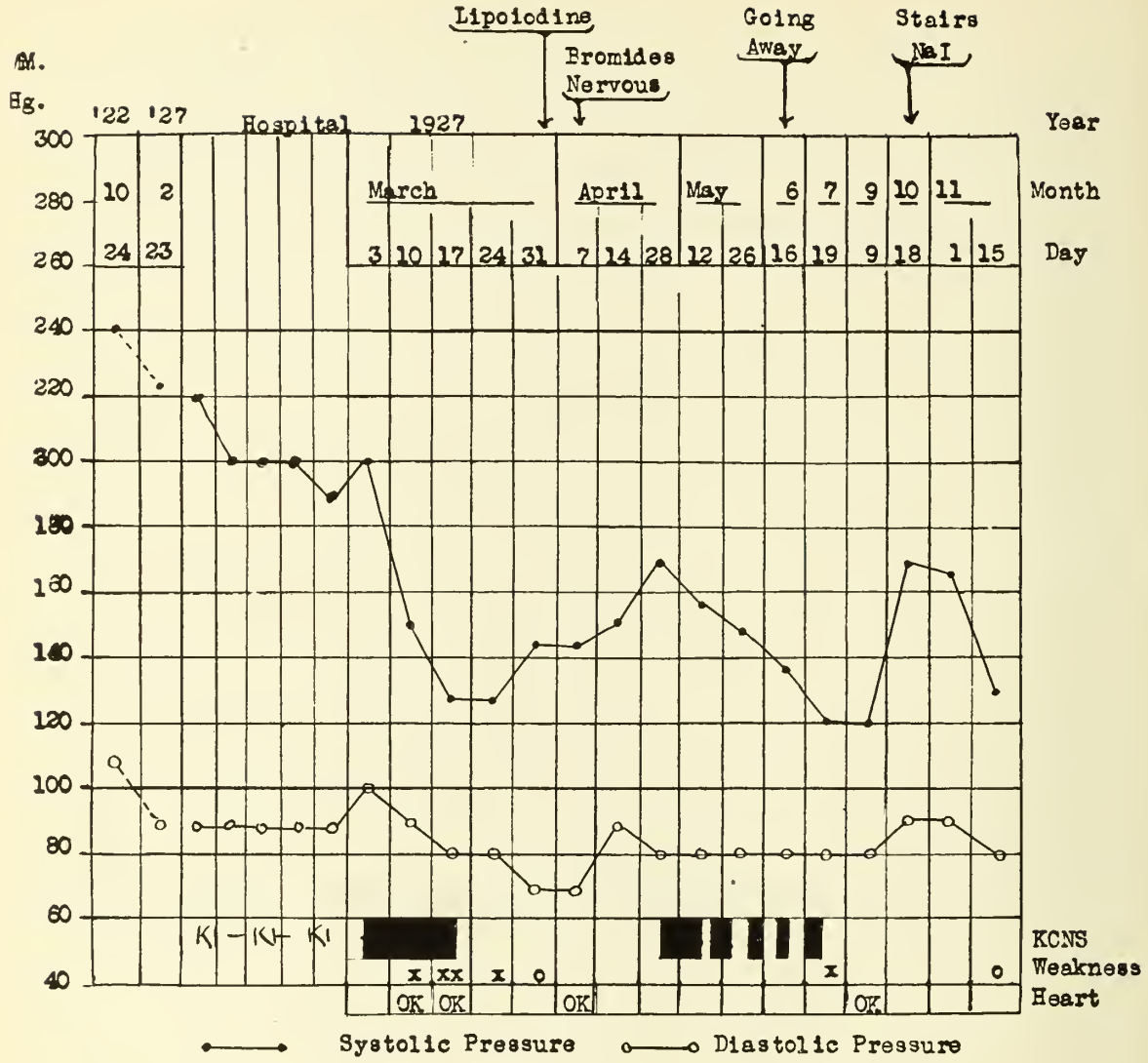

Chart 4. Case 6. Mrs. E. K. N. Age, 61. Diagnosis—Hyperpiesia, Angina Pectoris.

sure rose to 160/90, but came down again under ration doses to 140/90. She felt better when the blood pressure was down.

Case 9.—Mrs. A. T. Age 57. Diagnosis: Hyperpiesia.

This patient told me she had been attending a free dispensary for five years, during which time her blood pressure had ranged from 270 to 200. She stated that it had never been below 200 during all this time. I took her blood pressure on July 23, 1927, and found it to be 218/120. Under rest, diet, and sodium iodide, in one month, it came down to 160/90, but then steadily rose again to 200/130. Potassium sulphocyanate was started and the blood pressure came down in three weeks to 130/80, where it remained as long as patient stayed on ration doses of the drug.

Case 10.—Mrs. H. T. N. Age 41. Diagnosis: Hyperpiesia with secondary cardiac changes.

This patient was in bed at the hospital during the entire course of treatment. First week her average blood pressure was 210/120, during which time she was on a low protein, low salt diet, and sodium iodide. Potassium sulphocyanate was then given and in the course of three weeks the blood pressure steadily came down to 150/90, at which time the patient left the hospital. The last week at the hospital the patient was up and around but this apparently had no effect on the blood pressure. (See Chart 5.)

Case 11.—Mrs. H. G. Age 65. Diagnosis: Hyperpiesia.

This patient was under observation for nine months, during which time her average blood pressure under iodides was 190/100. The average blood pressure while on potassium sulphocyanate was 170/94. She complained of slight weakness at times when taking the medicine.

Case 12.—Mrs. A. C. Age 53. Diagnosis: 1, Hypertension heart with decompensation; 2, Neurosis.

This patient came to me with a decompensated heart and blood pressure of 290/150. Under rest in bed, diet,

etc., at the hospital the blood pressure came down to 210/120. Under three weeks of potassium sulphocyanate, the blood pressure came down to 200/100, but only small doses could be given as the patient did not tolerate the drug well. Three or four months later when the heart was in better condition, the drug seemed to be tolerated better, and the blood pressure came down to 184/90.

Case 13.—E. P. C. Age 42. Diagnosis: Hyperpiesia. This patient came to me because of retinal hemorrhages. I found a blood pressure of 225/150. Under sodium iodide and diuretin, the patient's blood pressure came down to about 210/130 as an average. Because of a psychic disturbance, the patient was removed to the hospital, during which time the average blood pressure was 204/120. The mental condition cleared in the course of three weeks and the patient was sent home on potassium sulphocyanate. During the next two months the blood pressure came down steadily, finally reaching a level of 130/80, when the patient was allowed to go back to work. (See Chart 6.)

A similar number of cases of essential hypertension treated by the old method of low protein and low salt diet with iodides, nitrites, bromides, etc., showed an average reduction in blood pressure of 17 points. The greatest reduction in any case was 52 points, while the poorest result was an increase of 36 points. The average reduction of the diastolic pressure was 7 points, and the greatest 30 points, and the poorest result was an increase of 10 points.

In analyzing the symptoms the patients had following and during the use of the drug, I find that nine complained of definite weakness, eight of definite increased nervousness (three of these cases however were neurotic), one of diarrhea; none complained of excessive salivation. Fourteen stated that they were feeling definitely better (which was probably due to the reduction of the blood pressure and possibly some slight sedative effect of the drug); one showed a definite edema of the eyelids; three exhibited dryness of the skin; and two (Cases 14 and 15) developed a severe dry scaly dermatitis associated with fever and some prostration. In both cases I believe it was due to an accumulation of the drug in the system, as it disappeared two or three weeks after discontinuing the drug. Both patients had taken more of the drug than had been prescribed—one having doubled the dose thinking he would derive twice as much reduction of blood pressure—and both having taken the drug two weeks longer than had been advised. In both cases the eruption was a dry, scaly, itching dermatitis covering the entire body and associated with fever and some prostration and marked inflammatory reaction of the skin. In both patients the blood pressure during the time of eruption was low. Although these two patients with secondary dermatitis had taken larger doses than prescribed, still there are patients in the series who really took much more of the drug than these two without showing any skin

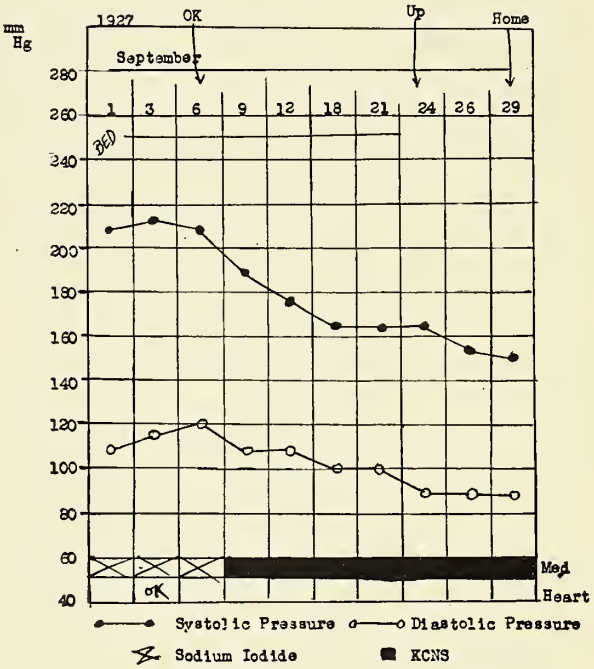

Chart 5. Case 10. Mrs. H. T. N. Age 41. Diagnosis—Hyperpiesia with secondary cardiac changes.

manifestations; so I believe that a special idiosyncrasy to the drug existed.

In all cases an 8 per cent solution of potassium sulphocyanate in distilled water was used, usually starting with a dose of one dram or a teaspoonful in a whole glass of water, three times a day after meals. This was usually continued for two weeks if no unfavorable symptoms (marked weakness, nervousness or dermatitis) resulted, at which time it was discontinued for two days and then the patient would take the same dose, omitting two days in each week. After four weeks or sometimes sooner, according to the drop in blood pressure and general symptoms of patient, it was reduced to twice a day. I continued this dose indefinitely on a ration basis, omitting the drug two to three days a week, as the case indicated. I believe in this way an accumulation of the drug can be avoided. In most of the cases this ration dose was enough to keep the

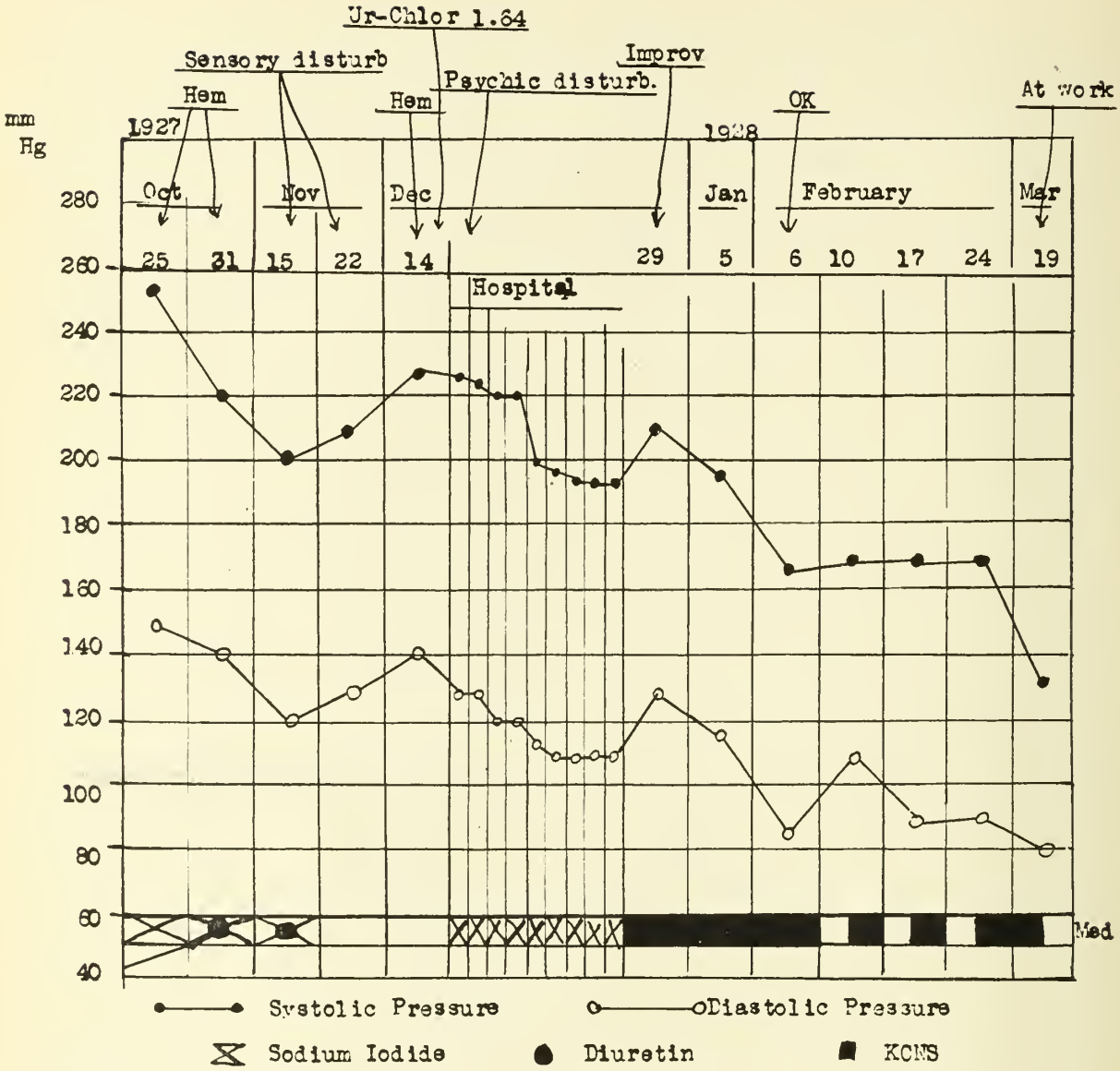

Chart 6. Case 13. E P. C. Age, 42. Diagnosis—Hyperpiesia, Hypertension Heart, Retinal Hemorrhages

blood pressure at a considerably lower level than it would have been otherwise without the drug. Some men report the patients complaining of nausea after taking the drug, but I did not note this in any of my cases.

CONTRAINDICATIONS

The only contraindications that I observed were in cases of idiosyncrasy to the drug in one way or another, and where there was considerable kidney or myocardial damage. I believe it would be wise to have an electrocardiogram taken before prescribing the drug, if the clinical impression indicates weakening of the myocardium. Other authors add to this list cases with extreme cardiac decompensation and all inflammatory conditions.

THEORY OF MODE OF ACTION

The question of how the drug acts is an interesting one. Takacs[6] believes the action of the drug results from the stimulation of the vagus, on the basis that the vasal dilators of an individual region proceed from the vagus. The lowering of the blood pressure after stimulation of the vagus is generally known and it can also be

assumed that the lowering of the blood pressure after the use of rhodan preparations occurs on account of the strengthened tonus of the parasympathetic nervous system or to stimulation of the vagus. He shows that if the vagus is first paralyzed with atropine the lowering of the blood pressure does not occur after giving the sodium sulphocyanate.

The explanation of the therapeutic effects of sodium sulphocyanate in lowering blood pressure is scarcely possible on the basis of the physiological and pharmacologic action, as in large doses it has been found to exert a directly opposite action. Nor does this therapeutic effect seem explainable on the ground of promoting the elimination of calcareous deposits in the sclerosed arteries, since the removal of such deposits would probably take place much too slowly to account for the prompt reduction of the blood pressure that frequently occurs. Besides, a more permanent reduction of blood pressure should be expected from decalcification of the arteries than occurs clinically.

The response of blood pressure to this or other treatment depends on the pathology and etiology of the particular case. Organic changes in the arterial walls and spasmodic contraction of the arterial muscles from nervous, toxic or other influences, are the two important factors. Where a marked hypertrophy of the elastic fibers of the media has taken place, a constant hypertensive level usually exists with only slight variations. Where only a spastic contraction of the arterial muscles exists without organic change, the hypertensive level fluctuates considerably. The range of this fluctuation should give one an idea as to how much organic change has taken place; for example if the fluctuation is only slight and the minimum systolic and diastolic levels noted are considerably above normal, then one would deduct that the organic changes in the arterial musculature have progressed considerably. The converse would indicate little or no organic change, the chief factor being a spasmodic condition. This latter type is the one more amenable to treatment. In either case it is advisable by whatever means possible to keep the blood pressure below 170 systolic, for it is above this level that Mosenthal[8] finds damage begins to the arterial system as well as the heart.

CONCLUSION

My impression from observations in the use of potassium sulphocyanate in twenty-four cases of essential hypertension leads me to believe that it is the most valuable drug that we have in reducing the blood pressure. If the proper precautions are taken in regard to dosage, no unfavorable symptoms should result. It is my plan to continue the use of this drug, making more carefully controlled studies. I realize that no definite facts can be derived from so small a series and among private patients where long periods of control readings are difficult to obtain. I am hoping that this paper may stimulate some well controlled research work in the use of the sulphocyanates in a large series of cases.

BIBLIOGRAPHY

1. Pauli, W.: Ueber Ionenurrgunken und ihre therapeutische Verwendung. Munchen. med. Wchnschr. 1, 153, 1903.
2. Bently, W., and Leroy, B. R.: The solvent action of the sulphocyanates upon the lime and magnesium deposits in the system. New York Med. Jour., lxxxviii, 21, 1908.
3. Westphal, K.: Thiocyanate therapy of genuine arterial hypertension. Munchen. med. Wchnschr., lxxiii, 1187, 1926.

3a. Westphal, K.: Thiocyanate and hypertension. Zentralbl. f. inn. Med., xlvii, 585, 1926.

3b. Westphal, K.: Rhodan und arterieller Hochdruck. Zentralbl. f. inn. Med., Leipz., xlvii, 585, 1926.
Westphal, K.: Die Behandlung des genuinen arteriellen Hochdruckes mit Kleinen und mittleren Rhodangaben. Klin. Wchnschr. v, 1995, 1926.
Westphal, K.: Rhodan und arterieller Hochdruck. Verhandl. d. deutsch. Gesellsch. f. inn. Med. Munchen, Kong. xxxviii, 432, 1926.

4. Kramer, R.: Ueber die Behandlung der Hypertension mit Rhodansalzen. Med. Klin., Berl., 1926, xxiii, 1968.
5. Gager, L. T.: The incidence and management of hypertension; with a note on sulphocyanate therapy. Jour. Am. Med. Assn., 82, 1928.
6. Takacs, I.: Versuche mit Rohdansalzen. 1. Einfluss der Rhodan auf Magensekretion, weisse Blutkorperchen, Pulschlage und Blutdruck. Ztschr. f.d. ges. exper. Med., Berl., 1926, 432. (Chart.)
7. Nichols, J. B.: The pharmacologic and therapeutic properties of the sulphocyanates. Am. Jour. Med. Sci., Phila., clxx, 735, 1925.
8. Mosenthal, H. O.: The treatment of essential hypertension. Jour. Am. Med. Assn., 91, 1928.

CLINICAL ASPECTS OF CYSTITIS*

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INFLAMMATION of the urinary bladder is a condition which is frequently met with in practice. It varies considerably in severity and progress, ranging from evanescent discomfort, with few symptoms, to a condition of severe distress and great disability; by itself rarely fatal, yet its effects and associated lesions may be extensive and destructive.

Presented with a case of cystitis in any form or degree, the clinician must acquaint himself with the exact pathological condition present, visualizing abnormal findings morphologically, bacteriologically, as well as mechanically, both locally and at a distance, and establish the causative factors, before a true estimate as to diagnosis, prognosis, and treatment can be determined. He must not linger long with mere local treatment, before searching locally, contiguously, as well as systemically, for the cause and extent of the trouble.

In a large proportion of cases of cystitis, one finds a mechanical interference with drainage directly or indirectly affecting the bladder; occasionally trauma, and usually a contiguous and spreading infection. From a clinical standpoint, while infection is always associated with urinary cystitis, traumatic irritation, and especially mechanical interference with drainage, is many times the exciting cause and reason for the continuation of the local infection, so that not only must the influx of bacteria be shut off, but physiological drainage be re-established. Then the cystitis will naturally clear up.

From a clinical standpoint, urinary cystitis can be classified according to etiology, pathology, or prognosis. According to etiology, we find cystitis due to chemical irritation, bacterial infection, infestation with yeast fungi and animal parasites, and mechanical causes. Pathologically we may have acute cystitis, usually superficial, localized or general, and chronic cystitis, which is usually deep or involves the interstitial tissues, including ulcerative and cystic cystitis, leukoplakia, malakoplakia, incrusted alkaline cystitis, simple and elusive ulcers, granuloma, and syphilis. As to prognosis, we have the resolving and progressive types of cystitis. We shall review this classification in more detail later.

Chemical cystitis may be caused by faulty metabolism, ingested or introduced poisons. Faulty metabolism may be of dietetic origin or due to individual dyscrasia. The resulting chemical irritants, which are excreted in excess in the urine, may be: oxalates, urates, phosphates, cystin or xanthin. Examples of foods which may produce metabolic irritants are: strawberries, tomatoes, asparagus and rhubarb. Glycosuria may cause a chemical cystitis. Ingested poisons or drugs liable to irritate the bladder are: cantharides, balsamic oils, turpentine, coal tar products, urinary antiseptics, and poor whiskey. Poisons introduced directly into the bladder are: bichloride of mercury, phenol and nitrate of silver, in caustic strength.

There is a normal resistance to infection of the bladder of a rather high degree, in the well-draining bladder. Bacteria excreted by the kidneys will be voided, without affecting the bladder, for indefinite periods, unless trauma or obstruction intervenes. In other words, infected urine does not necessarily mean cystitis, and bacilluria, as well as cocciuria, may be present, without pus. If a lessened resistance is developed through trauma, or continued congestion, as by exposure to cold or excessive venery, or a mechanical condition of obstruction or retention either partial or complete develops, then bacterial invasion is quickly established.

The bacteria associated with cystitis are most frequently the colon bacillus and staphylococcus. Less frequently we will find the bacillus tuberculosis, typhosus, pyocyaneus, proteus, lactis aerogenes and salmonella ammoniæ, the gonococcus, streptococcus, and micrococcus ureæ. Usually a mixed infection supervenes. Acute cystitis is more often associated with coccal infection; while chronic types are usually bacillary. Acid cystitis is produced by the colon bacillus, tuberculosis, typhoid and gonococcus; whereas the staphylococcus, streptococcus, pro-

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teus and salmonella ammoniæ are productive of an alkaline reaction in the urine.

Paths of infection may be ascending from the urethra and the ducts emptying therein, usually of gonococcal, staphylococcal or pyocyaneal origin. Descending infection is exemplified by tuberculosis. Infection by contiguity may follow a prostatitis, seminal vesiculitis, parametritis, pelvic or abdominal abscess. Infection through the circulation (hematogenous) may be caused by the streptococcus or typhoid bacillus, entering the bladder via the kidneys.

Acute cystitis may be caused by chemical irritants, dietetic, introduced or ingested poisons. Traumatism, whether accidental or by operative manipulation, may lower resistance to infection or establish mechanical barriers to drainage. Instrumentation, or the introduction of foreign bodies, may open the way to infection. A clean catheter or cystoscope properly introduced never causes a cystitis. By relieving retention, distention or back pressure, it prevents it instead. Under acute cystitis we must mention so-called honeymoon cystitis, a rather frequent occurrence, caused by congestion, traumatic irritation and infection by either the gonococcus or, more frequently, the colon bacillus.

Chronic cystitis is usually associated with obstruction or improper drainage, persistent influx of bacteria from the kidneys, or from a chronic prostatitis or parametritis. A localized form of chronic cystitis may take the form of a trigonitis, usually associated with either cystocele, urethral caruncle or prostatic enlargement.

The deep or interstitial types of cystitis may be listed as follows: ulcerative, gangrenous, cystitis cystica, leukoplakia, malakoplakia, incrusted alkaline cystitis, simple ulcer (Fenwick), elusive ulcer (Hunner), granuloma (Braasch), and syphilis.

Leukoplakia involves the bladder, as well as the ureters and renal pelvis, and was described by Rokitansky in 1861. It is associated with a long continued infection, either tuberculous or non-specific. An epithelial proliferation or keratinization develops, giving the bladder wall a characteristic whitish appearance. Malakoplakia is a rare condition described by Von Hansemann in 1903. Elevated yellowish plaques develop which assume pedunculated forms resembling condylomata. Incrusted cystitis with alkaline urine is described by Hager and Magath as a secondary invasion of the bladder with the Salmonella Ammoniæ, a Gram-negative bacillus, usually resident in the intestinal canal. It causes the liberation of an enzyme which converts urea into ammonia, causing alkaline urine, thus precipitating calcium, magnesium and ammonium, in the presence of any type of chronic bladder lesion—often of focal origin. Simple ulcer of the bladder was described by Fenwick as an entity in 1896. It is usually situated in the floor or base of the bladder and has a punched-out appearance. The Elusive Ulcer of Hunner is a submucous fibrosis with linear mucosal lesions. Granuloma of the bladder was described by Braasch and Hurley as localized areas of hyperplasia of mucosa and submucosa, varying in size, number and location. They favor the persistence of infection or may be confused with neoplasms. Syphilitic cystitis is uncommon, rarely associated with the secondary stage and chiefly a tertiary gummatous process. Cord lesions affecting bladder drainage are the more frequent luetic bladder affection, and disastrous in results.

Animal parasites causing cystitis are: Bilharzia, causing endemic hematuria, Trichomona vaginalis, and Anguillula Aceti. Vegetable fungi and yeasts associated with cystitis are: Penicillium glaucum, Mycelia, Oidium, Aspergillus, Actinomycosis, Sarcinæ Urinæ, and yeast fungi in sugar urines.

Mechanical causes such as foreign bodies, stones, tumors may produce local irritation. There may be trauma, either by direct injury or pelvic fracture; by catheterization or other instrumentation; by operative measures, as in hysterectomy; by fetal head pressure or instrumental delivery. Exstrophy of the bladder always is accompanied by a chronic cystitis. Contiguous causes of bladder irritation may be pressure of extravesical tumor, invading malignancy, or perforating abscess.

Obstruction, which interferes with proper bladder drainage in one form or another, is the most important cause of cystitis, especially of a chronic or progressive type. The various mechanical factors entering into this classification may be enumerated as follows: phimosis, urethral stricture (male and female) or rupture of the urethra, prostatic enlargement, whether due to adenoma, carcinoma or prostatitis, contracture of the vesical neck or bar, bladder tumor, ureterovesical cyst, diverticulum, cystocele or pelvic

floor relaxation. Spinal cord lesions which cause atony or improper drainage of the bladder are: degenerative myelitis, traumatic injury or pressure from a tumor within the spinal canal, and tuberculosis of the vertebræ in its destructive stage. These various mechanical, as distinguished from the infectious, factors causing cystitis, lower resistance, produce chronic congestion, and interfere with drainage, allowing bacterial fermentation and infiltration, which, in spite of any treatment directed, either locally or internally, against the infection, will persist until physiological drainage is re-established. The mere presence of bacteria in the bladder seldom causes pathological changes without some mechanical change exciting it; that is why careful catheterization and cystoscopic manipulation seldom cause cystitis, in spite of the many chances of infection to which the bladder is thereby exposed.

The most frequent cause of unresolved cystitis is interference with drainage, whether due to congenital defects, trauma, prolapsed bladder, stricture, or tumor in the lower excreting canal or neighboring tissues, and spinal cord disease. Given obstruction with infection, the infection spreads to the upper urinary organs and a vicious circle is established; metabolism is affected and a dangerous condition exists, and either a fulminating or a chronic destructive process ensues. If the cycle can be broken, well and good; if local treatment only is used and the indirect causative factors unrecognized, relief will not be obtained unless a kindly "vis naturæ medicatrix" steps in to perform for us.

When confronted clinically with a case of suspected bladder inflammation, it is essential to gather a careful history, first of all, noting any indication of focal infection—the teeth, tonsils, sinuses, appendix, gallbladder, prostate, and cervix uteri being the most frequent offenders. Tuberculosis and syphilis should be recognized if present. The physical examination should begin with a local investigation for cystocele, pressure of neighboring pelvic or abdominal organs, interfering with adequate drainage of the bladder or ureters. Stricture of the meatus or urethral canal, caruncle, prostatic obstruction or infection, seminal vesiculitis or infection of Cowper's, Skene's or Bartholin glands, urethritis, or pressure due to congenital anomalies, may be present. Exstrophy of bladder is self evident. Kinked or strictured ureter, pyelitis or pyelonephritis should be ruled out. A careful examination of bladder urine must be made and cultures developed. Pelvic and rectal examinations are instructive, and finally urethroscopic and cystoscopic studies may be indicated, looking for stricture, ulcers, foreign bodies or calculi; ureteral catheterization to determine stricture or infection. *X*-ray studies of the kidneys, ureters and bladder may be needed to clear up the picture. In short, our problem is to seek the predisposing and exciting causes by investigating the whole urinary tract and the body as a whole, so that the causes can be found and removed. The cystitis will then rapidly subside. Treatment is impossible without a comprehensive pathological diagnosis.

SUMMARY

1. Do not treat a case of urinary cystitis without making a thorough clinical examination.
2. Pathological diagnosis is essential for successful treatment.
3. An apparent cystitis may be the first clue to an associated pathological condition in the urinary organs.
4. Cystitis is often a minor ailment, but should not be accepted as such until proven so by careful study.
5. Cystitis is caused by chemical irritation, infection with bacteria, animal parasites, yeasts, or fungi.
6. There exists a high degree of immunity to infection in the normal bladder wall.
7. Mechanical factors involving proper drainage of the bladder are exceedingly important in the etiology of cystitis.
8. Determination of associated lesions and their correction is the basis of the treatment of most cases of cystitis.

DISCUSSION

HERMON C. BUMPUS (Rochester, Minn.): Doctor Sohmer's review of cystitis was so complete that there is really little for me to add. However, I do feel that one type of the disease that we are seeing in increasing numbers calls for special emphasis, namely, the so-called elusive ulcer of Hunner or, as we prefer to term it, interstitial cystitis. The symptoms are characterized by the most extreme frequency, at times as frequent as every fifteen minutes day and night. The least bladder distension is accompanied by the most extreme pain, compelling the patient to empty the bladder at once. There is usually experienced pain in one or the

other lower quadrants upon walking or riding. Yet with all these evidences of extreme cystitis the urinalysis is negative.

When therapy consisted in resection of the involved area, pathological examination showed round cell infiltration and Doctor Meisser and I were able to produce the disease experimentally in rabbits by the intravenous injection of organisms from foci in the teeth and tonsils, thus indicating that it is really an infection of the bladder wall when in the acute stage. Resection proved of little value because of its postoperative limitation of bladder capacity and was abandoned. Following this, electrocoagulation of the involved area became the accepted procedure. However, recurrences were frequent and continued electrocoagulation impossible. More recently I have been overdistending the bladder under an anesthetic. This has given surprisingly good results. Of how long duration, time alone will tell, but the method is simple and its repetition is feasible.

THE TRICHO SYSTEM

According to the advertising booklet distributed by "beauty parlors": "Tricho System is the invention of Albert C. Geyser, M.D., a New York physician internationally famous as a specialist on Electro-Therapy." Dr. Geyser claims to have so modified the *x*-rays that with his apparatus it is possible to produce permanent baldness in hairy areas without any possibility of doing damage to the skin. It is not necessary to tell physicians—at least, those with any extensive dermatologic experience—how serious a menace is the use of *x*-rays in the removal of superfluous hair. The tragedy in the case arises from the fact that the pre-cancerous keratoses and other untoward effects are usually not evident for months after the "treatment" has been given. Further, the victims—nearly always women—frequently refuse to prosecute, because of the inevitable publicity. A few dermatologists have, however, reported cases of the disfiguring and dangerous sequelæ that have followed the use of the Tricho System. (Jour. A. M. A., January 19, 1929, p. 252.)

WHY HAVE INFLUENZA?

The following are a few of the numerous advertisements of products of manufacturers that are capitalizing the present epidemic of influenza: Adlerika, Creomulsion, Bulgarian Herb Tea, Kogene, Glyco Thymoline, Father John's Medicine, Pluto Water, Nujul, Lifebuoy Soap, 666, Vapex, S S S, Zonite, Nozol, Musterole, Luden's Menthol Cough Drops, Florida Oranges and Grapefruit. (Jour. A. M. A., January 19, 1929, p. 253.)

THE DOCTOR AS TRAINER OR HEALER

"Doctors ought to be like the mechanicians who take contracts to keep clocks going and on time, rather than emergency men to be summoned when timepieces stop or are too fast or too slow."

G. E. Vincent, *Bulletin of the New York Academy of Medicine,* November, 1928.

President's Letter

"IT GIVES A LOVELY LIGHT"

"Of course we are a smart people. We know about the violet ray and pay $14.95 for a little dingus that gives a purple light."

Quillen in the *St. Paul Dispatch.*

MR. EDISON when asked about these appliances for household use is quoted as saying "Ridiculous." That the violet ray is of undoubted value when intelligently used, probably admits of little argument, but on the other hand when this or any other form of therapeutic lamp or electrical appliance is handled by those who are unskilled, or lacking a knowledge of the physics of light in general or the violet ray in particular, they are quite as likely to be harmful as they are to be beneficial. In an article, "A Comparison of Cod Liver Oil and Ultra-violet Light for Use in the Prevention of Rickets," in the November, 1928, issue of the *American Journal of Diseases of Children,* Dr. Holmes, Boston, Mass., and his co-workers, tell of using a definite brand of cod liver oil, which according to the test described in the U. S. Pharmacopeia, showed a vitamin content of 1.250 units per gram. The intensity of the current from the ultra-violet lamp was also accurately measured. This latter showed that the wattage varied materially from day to day, owing to fluctuating conditions in the city lighting circuit, a point to be borne in mind under all conditions of exposure to the ray. It was noted that the animals receiving fifteen minutes irradiation and 15 mg. of cod liver oil gained slightly more than those which received either ultra-violet light or cod liver oil alone. It also appears that the calcium and phosphorus content of the blood was materially higher in the blood of animals receiving cod liver oil alone than in those exposed to irradiation alone. The results showed that the daily ingestion of 5 mg. of the cod liver oil used in this series of experiments gave greater protection against rickets than fifteen minutes exposure to the ultra-violet light.

Attention is called to this subject by our having seen recently several babies quite badly burned from the use of these lamps in unskilled and untrained hands, and a word of caution seems to us to be quite in order. Obviously, those who use these appliances should do so only after acquiring as definite a knowledge of the power and possibilities of light treatment as is obtainable.

EDITORIAL

MINNESOTA MEDICINE

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TUBERCULOSIS IN MINNESOTA

It is generally known that the incidence of and mortality from tuberculosis have shown a decided decrease in Minnesota as well as throughout the country in recent years. A survey of vital statistics kindly furnished by the State Department of Health has been made and some rather interesting facts have been deduced. No accurate information can be obtained from the number of active cases reported as to the incidence of the disease, for checking of death certificates has shown that many individuals dying of tuberculosis never have been reported previously. The mortality figures present a much more accurate picture of the tuberculosis situation and conclusions have been drawn from these alone. Unless otherwise stated figures refer to Minnesota only.

In 1890 the death rate from all forms of tuberculosis was 112.99 per 100,000. In 1909 the rate was unchanged (112.85). Even as late as 1918 there was evidence of only slight improvement, the rate having been reduced to only 108.43 in spite of all the effort expended in the fight. Since 1918, however, there has been a steady and marked decline in the death rate, except for a temporary increase in 1923, until in 1927 the rate had been nearly halved (58.34), the rate from pulmonary tuberculosis alone being in that year 50.22. It took a number of years for the education of the public and the segregation of cases at home and in the state, county and private sanatoria to affect the mortality rate.

An analysis of the reduction in mortality from the standpoint of age and sex is illuminating. The reduction in total deaths from tuberculosis has been from 2,275 in 1917 to 1,570 in 1927—a very encouraging showing. Each year during this period almost invariably more males than females succumbed to the disease although the male preponderance the last seven years has been but slight. A comparison of the two sexes in various age groups, however, shows marked variation in the totals for this eleven year period. From the ages 10 to 19 inclusive the females have predominated over the males, 2 to 1, while from 45 to 65 the situation is reversed and twice as many males as females died of tuberculosis. In the age group 20 to 24 the total deaths for this eleven year period showed a ratio of about 4 females to 3 males. In the next age group (25 to 29) the reduction in deaths among the females has been less marked than among the males so that conditions had become reversed during the eleven year period and more females die of the disease each year than males.

Some further figures might be of interest. During the past five years one-fifth of all tuberculosis deaths occurred between the ages of 15 and 24. One-fifth of the total deaths in Minnesota during the past five years in the age period

of 15 to 19 were due to tuberculosis (608 of 2,871 deaths), while between the ages of 20 and 25 nearly one-third of the deaths were due to tuberculosis (1,129 of 3,656 deaths).

On checking the number of patients in the sanatoria in Minnesota it has been found that the females in the age group 15 to 24 outnumber the males 2 to 1. In Saint Paul the past years the female death rate in the age group 15 to 19 predominated nearly 3 to 1 (59 to 20) over the males.

Generally speaking we may say, then, that whereas there has been a marked reduction in the death rate from tuberculosis in Minnesota since 1917 so that the male and female sexes are about equally affected today, the reduction in the mortality in the female sex in the age group 15 to 19 has not been so marked as in the male sex. The male deaths, however, outnumber the female deaths 2 to 1 in the age group between 45 and 65.

Nor are these findings limited to Minnesota. In New York City in 1926, 257 girls between the ages of 15 and 20 died of tuberculosis of all forms compared with 139 boys. In Baltimore there was also a marked predominance of girls in this age group compared with boys during the period from 1910 to 1926. In Cleveland the death rate in 1918 was equally distributed between the sexes in the 15 to 25 age period. Comparing the average death rate in this city for the years 1910 to 1914 with that for the years 1922 to 1926 the reduction in the female death rate was only 14 per cent compared with 52 per cent for males.

The explanation of such variations is not clear. Doubtless a number of factors have a bearing on the situation. Habits and exposure should be considered.

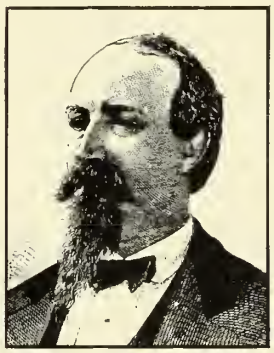
We know that rest, proper nourishment and sunshine will cure many cases of tuberculosis. Lack of these factors doubtless plays an important part in the development of the disease. The present-day passion for a "good time" leads to lack of sufficient rest. The boyish figure necessitates undernourishment. The present vogue of scanty attire while of distinct advantage from a health standpoint in mild weather is distinctly disadvantageous in cold weather.

It is possible too that girls are more exposed to open cases of tuberculosis in the home than boys. It is difficult to explain why men between the ages of 45 and 65 die twice as frequently as women of the same age.

What can members of the medical profession do to remedy the situation? They can at least call attention to the situation and suggest preventive measures. It then remains for the parents of young girls particularly to insist that preventive measures be carried out.

HISTORICAL COMMITTEE

We haven't been informed by Dr. Workman that anyone has guessed the answer to our riddle of last month. Well, we might as well tell you. Dr. J. S. Stewart of St. Paul, surgeon of the First Minnesota Volunteer Infantry, was the first volunteer surgeon to enlist for the Civil War. Dr. Thomas R. Potts examined the first recruit for that regiment, Captain Josias R. King, who was the first man to enlist as a volunteer in the Civil War on the Union side. We present portraits of both Potts and Stewart.



J. S. Stewart

In our first contribution to the department we asked you if you knew that a Minnesota Medical Society was formed as early as 1853. Our present association records state it was in 1855, so we hereby advise that the records be changed to read 1853.

T. R. Potts

Dr. Potts had the honor of being elected President of that society. He presided also when our present association was formed in 1869. The old society apparently had been quiescent for some years. Shall we give you some more next month, or will you give us one? If you don't, we shall have to continue, if our editor will give us space.

J. M. A.

PAY CLINICS

The cost of sickness has increased in the last two decades out of proportion to the general increase in the cost of living. Never in the history of the world, however, has any country ever reached a high level of living comparable with that in America today. The automobile and radio have come to be considered such necessary equipment of the modern American family that they do not serve as obstacles to the tendering of free medical services to the owners.

The high cost of medical care is, nevertheless, a problem confronting the people today and is of vital interest to the profession. In an effort to solve it the committee headed by Dr. Ray Lyman Wilbur, President of Leland Stanford University, and composed of medical men for the most part, has laid out a five year program.

Most communities have for some time helped to solve the high cost of medical care, which is not entirely a new problem. The endowment and physical equipment (to say nothing of annual deficits) of many a hospital have been the gifts of wealthy citizens or the outcome of community campaigns. Few modern hospitals expect to do better than make expenses.

When, however, communities or "funds" begin to supply the services of physicians at cut rates in competition with private practice, it behooves the profession to express its disapproval in no uncertain terms. The pay clinic, so-called, as represented by the Cornell Clinic in New York city, is typical and has been the subject of debate in medical circles since its inception. New York is far enough away so that a pay clinic there can be mentioned with less danger of stirring up local animosity. Nevertheless medical activities right here in our own state by state, municipalities and beneficial associations are also good examples of unfair competition with general practice.

The Julius Rosenwald Fund with headquarters in Chicago is proposing to devote some of its funds to pay clinics or the like. An editorial in the December number of the Illinois Medical Journal came out frankly in opposition to the establishment of a pay clinic in Chicago on the ground that where a Fund or Foundation employs physicians and then furnishes services to the public for nominal fees it is competing with private physicians. "Ultimately the existence and development of such institutions will prove disastrous to medical practice, from the standpoint of the profession itself and of community welfare," this editorial avers. It really matters little whether the exchequer of a state or of a fund supports physicians in clinics which are cutting fees and competing with the profession at large. Mr. Michael Davis of the Rosenwald Fund is scheduled to address us at the Medical Economics meeting during the state convention and perhaps will be able to convince us of the desirability of Pay Clinics.

What other profession or business enterprise would sit complacently by and allow capital under the guise of philanthropy to deliberately interfere with private enterprise to the extent of offering their commodity to the public at less than the cost of production?

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Is Medical Science Out of Step?

A superintendent of a good sized city school in Minnesota wrote us as follows:

"It seems to me that if Medical Science is out of step, except for the League Against Compulsory Medication, something should be done to inform the League. If not, something should be done to compel the League to prove statements that are contained in the enclosed."

Attempts have been made to interest the public in the truth about modern public health through various organizations as Parent Teachers Associations, Luncheon Clubs, Women's Clubs and so forth by having members of the medical profession speak at their health meetings. Many of these meetings have been held and in practically every case we have a report from the medical speaker as follows:

"This meeting seemed to be quite a success from the standpoint of the layman, but I was very much surprised at the lukewarm support we had from the profession down there. Out of some thirteen or fourteen medical men in that city, only two were present, the presiding chairman, Dr. ————, and Dr. ————. I should say that there were probably two hundred adults in the audience. They seemed to follow the subject with a great deal of interest and asked innumerable interesting and sensible questions after the close of the talk. It is my impression that this campaign is much more upon the doctors than it is upon the lay people."

It seems to us that the doctors should take a greater interest in these meetings and attend them if for no other reason than to know what was said so that they can discuss the subject intelligently with their patients. It is difficult for the lay person to always grasp scientific questions.

It happened that this speaker was a professor from the medical school of the University and talked upon the all-important question of diphtheria immunization. Considering that a campaign is being planned by the Minnesota State Medical Association, in coöperation with the Minnesota Public Health Association and the State Board of Health, it seems to us that this meeting was of unusual interest and importance to the local profession.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

THE STATE MEDICAL MEETING

The annual meeting of the State Medical Association will be held in Saint Paul, May 13, 14 and 15, 1929. Sessions will be held at the Masonic Temple, which has proved especially well adapted for the meetings of both sections.

Clinics will be offered all day Monday in the various specialties by members of the Ramsey County Medical Society, who are acting as hosts to the Association members this year.

The Medical Economics meeting, which has come to be an annual Monday night affair and to which members and their families are invited, will be addressed by Michael Davis of the Julius Rosenwald Fund, Chicago, and Dr. Morris Fishbein, editor of the A. M. A. Journal.

This year the scientific meetings will be addressed by a number of nationally known physicians: Dr Elliott P. Joslin, Professor of Medicine at Harvard; Dr. Clarence W. Hopkins, Chief Surgeon of the Northwestern Railway, Chicago; Dr. W. T. Engelback, Endocrinologist, Saint Louis; Dr. George P. Muller, Professor of Surgery, University of Pennsylvania; Dr. Henry G. Bugbee, Urologist, New York City.

UPPER MISSISSIPPI MEDICAL SOCIETY

Officers for the coming year were elected at the annual meeting of the Upper Mississippi Medical Society, January 31. It was also voted to hold a fall meeting at Little Falls in connection with the sessions of the Stearns and Benton county medical societies.

The new officers are: President, Dr. Thayer Davis, Wadena; first vice president, Dr. Robert Christie, Long Prairie; third vice president, Dr. J. J. Ratcliffe, Aitkin; secretary-treasurer, Dr. G. I. Badeaux, Brainerd.

Dr. B. W. Kelly, Aitkin, and Dr. S. S. Shannon, Crosby, were chosen delegates to the State Medical association convention at Minneapolis, with Dr. M. P. Gerber, Brainerd, and Dr. John A. Thabes, Jr., Brainerd, as alternates.

The day's session closed with a banquet at the Masonic hall. Thirty-five doctors attended.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The annual meeting of the American Association for the Study of Goiter will be held this year at Dayton, Ohio, on March 25, 26 and 27. The primary object of this association is to bring together each year men who are especially interested in the study of goiter and its associated problems. Members of state and provincial medical societies are eligible and cordially invited to participate as attending members.

The 1928 meeting, which was held at Denver, was a decided success. Professor B. Breitner of the Von Eiselsberg Clinic of Vienna and Dr. Gulbrand Lunde, professor of biochemistry of Oslo, Norway, were the foreign guest speakers. Drs. H. S. Plummer, S. F. Haines, J. deF. Pemberton and William Boothby of The Mayo Clinic held clinics and presented papers. Among the other contributors to the program were W. Blair Mosser of the University of Pennsylvania; W. H. Cole, N. A. Womack and S. M. Gray of Washington University, St. Louis; A. E. Hertzler, Halstead, Kansas; J. L. DeCourcy, Cincinnati; Allen Graham, Cleveland; H. M. Clute of Lahey Clinic, Boston; J. Tate Mason of Mason Clinic, Seattle; and Willard O. and P. K. Thompson of the Massachusetts General Hospital Thyroid Clinic.

The first day of the Dayton meeting will be given over to diagnostic clinics in the morning and several short papers during the afternoon chiefly concerned with recent experimental work. On the second day, operative clinics will be held at the Miami Valley Hospital, St. Elizabeth's Hospital and at the Soldiers' Home Hospital. The afternoon of the second day and the morning and afternoon of the third day will be given over to the presentation and discussion of scientific papers.

The headquarters will be at the Hotel Miami. Dr. William A. Ewing is President of the Montgomery County Medical Society, under whose auspices the meeting is to be held. Dr. E. M. Huston is the General Chairman of the Committee on Arrangements. Dr. H. C. Haning is Chairman of the Hotel Committee. All communications in regard to hotel reservations should be addressed to Dr. Haning at the Reibold Bldg., Dayton, Ohio.

MISCELLANEOUS

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Robert McGraw, negro, Villard, Minnesota, was arrested Jan. 21, 1929, on a complaint filed by the investigator of the Minnesota State Board of Medical Examiners charging him with practising healing without a Basic Science certificate. The complaint involves the treatment by McGraw of one Frank Weber. Weber is a diabetic and is under medical treatment at the present time.

A preliminary hearing was held in the case at Glenwood, Minnesota, Saturday, Feb. 2, 1929. The defendant was represented by the same counsel he had last June. After a hotly contested hearing the defendant was bound over to the District Court for trial at the next term of Court under bonds of $750 to stand trial.

OBITUARY

Charles Lyman Greene

1862-1929

Dr. Charles Lyman Greene of Saint Paul was born in the town of Gray, Maine, September 21, 1862, the son of Dr. William Warren Greene, who practised surgery in Massachusetts and Maine and later was professor of surgery in the University of Michigan.

As a result of his father's death in 1881, Charles Lyman entered a railroad office but later determined to make use of his father's medical library. Following his marriage to Miss Jessie Rice in 1886 he took up the study of medicine at the University of Michigan. He later changed to Minnesota, where he graduated in 1890. After postgraduate study abroad, he was appointed first assistant city physician of Saint Paul in 1891. Following another trip abroad and after attending lectures at Harvard and Johns Hopkins universities he was appointed instructor in applied anatomy at the University of Minnesota in 1894; professor of clinical medicine and physical diagnosis in 1897, and professor of theory and practice of medicine in 1903. Dr. Greene became professor of medicine and chief of the Department of Medicine in 1909, a position he filled until 1915. Until September, 1928, Dr. Greene had been chief-of-staff at St. Luke's Hospital in Saint Paul for several years.

Dr. Greene was a member of the following societies: the Association of American Physicians, the American Association for the Advancement of Science, the Minnesota Academy of Medicine, the American College of Physicians, the American Therapeutic Society. He was at one time the president of the Minnesota State Medical Association and was the first president of the Minnesota Society of Internal Medicine. He was formerly medical director of the Minnesota Mutual Life Insurance Company and president of the National Association of Life Insurance Examiners.

Dr. Greene became well known nationally as a medical author. He appeared frequently in local medical journals and his articles were published in the New York Medical Journal and the British Medical Journal. He was the author of a book on Medical Examination for Life Insurance, and his Medical Diagnoses, which expanded as it went through six editions (the last edition appearing in 1926), was his most important contribution.

Dr. Greene was a member of the Minnesota Club and the University Club of Saint Paul; the Lafayette Club, Lake Minnetonka; the National Arts Club of New York City; the Authors Club, Royal Societies Club and American Universities Club of London. He was also a member of Nu Sigma Nu, Alpha Omega Alpha and Delta Kappa Epsilon.

During the World War Dr. Greene was obliged on account of physical disability to apply for service as Contract Surgeon. He was, however, commissioned as Major, October 11, 1918; Lieutenant Colonel, April 28, 1919; Colonel, Medical Section, Officers' Reserve Corps, July 15, 1919.

His death came rather suddenly January 19, 1929, thus terminating a period of a year or more of enforced inactivity on account of ill health. Dr. Greene's generosity and equanimity endeared him to a host of friends both within and outside the ranks of the profession.

He is survived by two daughters, Mrs. Frederick Ritzinger of Saint Paul and Mrs. Alfred Schweppe of Seattle, Wash.

Johannes K. Moen

1867-1929

Dr. Johannes K. Moen, 61 years old, for 20 years a practising physician in Minneapolis, died Feb. 3, 1929. He was born in Tellemarken, Norway, in March, 1867, and came to this country in 1885. He lived on a farm near Kenyon, Minn., and attended the Red Wing seminary. Dr. Moen was graduated from the medical school at the University of Minnesota in 1893, and practised medicine in Windom, Minn., before locating in Minneapolis.

Dr. Moen was a member of several fraternal organizations, including Fraternal Order of Ancient Masons, Sons of Norway, and Scandinavian American Fraternity, of which he was head physician. Dr. Moen wrote several books in the Norwegian language.

Surviving are four children: One daughter, Mrs. Rolf Opjorden of Milan, Minn.; and three sons, Frithjof G., Dr. Johanes R., Jr., and Luther J., all of Minneapolis.

George Lewis Saylor

1859-1929

Dr. G. L. Saylor, aged 70, one of the first physicians to locate in Hibbing, died at his home Feb. 1, 1929, following a long illness. Suffering a stroke Sept. 11, he had been confined to his bed since then, gradually sinking until the end came.

George Lewis Saylor was born March 22, 1859, at Columbus, Ga. He was a graduate of Independent College of Medicine, Chicago, and also a graduate pharmacist. He located in Eveleth in 1901, later going to Hibbing. He first practised at Benson, Minn.

In his early days Dr. Saylor was a well-known athlete. He was a member of the Red Wing, Minn., firemen's hose team which won the world's championship at Albert Lea in 1876. He was a member of the American Medical Association and the Minnesota Pharmaceutical Association and the Old Settlers of Hibbing.

Surviving are the widow and a son, John, Hibbing, and a brother, Charles, living in Ladin, S. D.

OF GENERAL INTEREST

Dr. James A. Cosgriff has moved from North Mankato to Olivia.

Dr. and Mrs. George Douglas Head are spending the winter months in California.

Dr. and Mrs. N. O. Pearce of Minneapolis are visiting in St. Petersburg and Miami, Florida.

Dr. Roger G. Hassett, formerly of Bird Island, is now located in Mankato, where he has opened offices in the Medical Block.

Dr. J. H. Bliss of Rochester has gone to Brooklyn, N. Y., where he will be Junior Surgeon at the Methodist Episcopal Hospital.

Dr. Gordon G. St. Clair has moved from Nopeming, Minnesota, to Ah Gwah Ching, where he is associated with the Minnesota State Sanatorium.

Mr. and Mrs. George Treat Trenholm of Rochester are receiving congratulations on the birth of a son. Mrs. Trenholm is the daughter of Dr. and Mrs. Charles H. Mayo.

Dr. and Mrs. Paul Oberg and daughter, Margaret, have returned from a five months' tour of England and the European continent. Dr. Oberg spent three months in postgraduate study on the eye in Vienna.

Mrs. William Davis, wife of Dr. William Davis of Saint Paul, died February 18 following an operation performed the week before. Dr. and Mrs. Davis celebrated their golden wedding anniversary last summer.

Announcement has been received from Dr. B. H. Hager, Rochester, of the opening of an office for the practice of urology in association with Dr. Anders Peterson at 1136 West Sixth Street, Los Angeles, Calif.

Word has been received of an excellent opening for an experienced young physician and surgeon at Carrington, North Dakota. Communications should be addressed to Mr. J. S. Odland of the First National Bank of Carrington.

Dr. L. R. Boies, who had his offices at 420 LaSalle Bldg., Minneapolis, has gone to Boston to specialize in Oto-laryngology. He expects to spend the next three years in study at Harvard Medical School and at the Massachusetts Eye and Ear Infirmary.

Dr. Archa E. Wilcox has been elected chief of staff of Eitel Hospital, Minneapolis, succeeding Dr. J. C. Sessions. Dr. C. N. Spratt was named first vice-president; Dr. F. R. Hirschfield, second vice-president, and Dr. George D. Eitel, secretary-treasurer.

Members of the state executive committee re-appointed for 1929 are: Dr. H. Longstreet Taylor and W. A. Laidlaw, St. Paul; Dr. Alfred E. Koenig, Minneapolis; Dr. O. E. Locken, Crookston; Dr. A. T. Laird, Duluth, and Mrs. J. A. Thabes, Brainerd.

Dr. P. E. Hermanson has disposed of his practice at Ivanhoe and recently moved to Hendricks, where he has taken over the practice of the late Dr. L. E. Nelson. Dr. William Yaeger of Revillo, South Dakota, has purchased the practice of Dr. Hermanson at Ivanhoe.

The marriage has been announced of John Archibald Cameron, Jr., son of Dr. and Mrs. J. A. Cameron of Saint Paul, to Miss Violet Marie Halloran of Saint Paul, which took place January 18. Mr. Cameron is a student in the college of medicine at the University of Minnesota.

Dr. S. A. Slater, superintendent of Southwestern sanatorium, Worthington, has been appointed to the executive committee of the Minnesota Public Health association. Dr. Slater has been prominent in state anti-tuberculosis activities for years, and won national prominence as the result of a study of tuberculosis infection in children in southern Minnesota.

Dr. Robert Earl of Saint Paul has been re-elected chairman of the board of directors of the Northwestern Baptist Hospital Association for the year 1929, bringing his years of service in this capacity to twenty-five. Dr. George Earl was re-elected president; Dr. Frank Peterson of Minneapolis, vice-president, and Rev. G. Arvid Hagstrom, secretary-treasurer.

Dr. A. L. Haynes, for five years junior physician at the state school for feeble-minded at Fairbault has been announced as the successor to Dr. D. E. McBroom, formerly senior physician of the institution. Dr. McBroom is now head of the epiletic colony at Cambridge. Dr. Jackson Herbert of Spartansberg, S. C., recently affiliated with the Philadelphia general hospital, assumed his new duties as junior physician at the school in January.

STATE BOARD OF MEDICAL EXAMINERS

At a meeting of the State Board of Medical Examiners held February 15, Dr. E. T. Sanderson of Minnesota was elected executive secretary to take the place of Dr. A. E. Comstock of Saint Paul. A few days previous to the meeting the announcement had been made of the appointment of Dr. Edward J. Engberg of Saint Paul as Board member.

Following the death of Dr. McDavitt in March, 1926, the duties of the office of Executive Secretary had been carried out by Dr. A. E. Comstock of Saint Paul. Under the new Medical Practice Act passed by the last legislature a new Board of seven members was reappointed. Dr. Comstock received a one year appointment from May 1, 1927, but has remained active until his successor was appointed February 15. According to the new Act the Council of the State Medical Association shall recommend three physicians within thirty days of the expiration of the term of any Board member and the Governor may appoint one of the three names submitted.

The office of the State Board of Medical Examiners will continue to be conducted at 524 Lowry Medical Arts Building, Saint Paul.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

CIBA COMPANY, INC.

Lipoiodine-Ciba, Diagnostic

Ampules Lipoiodine-Ciba, Diagnostic, 5 c.c.

H. K. MULFORD CO.

Acidophilus Bacillus Liquid-Mulford

E. R. SQUIBB & SONS

Dandelion Pollen Allergen Solution-Squibb; English Plantain Pollen Allergen Solution-Squibb; Goldenrod Pollen Allergen Solution-Squibb; Perennial Rye Grass Pollen Allergen Solution-Squibb; Ragweed (Dwarf) Pollen Allergen Solution-Squibb; Ragweed (Giant) Pollen Allergen Solution-Squibb; Red Top Pollen Allergen Solution-Squibb; Russian Thistle Pollen Allergen Solution-Squibb; Sunflower Pollen Allergen Solution-Squibb; Bermuda Grass Pollen Allergen Solution-Squibb, 5 c.c.; June Grass Pollen Allergen Solution-Squibb, 5 c.c.; Mugwort Pollen Allergen Solution-Squibb, 5 c.c.; Orchard Grass Pollen Allergen Solution-Squibb, 5 c.c.; Sagebrush Pollen Allergen Solution-Squibb, 5 c.c.; Western Ragweed Pollen Allergen Solution-Squibb, 5 c.c.

ABBOTT LABORATORIES

Ampoules Metaphen Solution 1:1,000, 10 c.c.

ELI LILLY & CO.

Erysipelas Streptococcus Antitoxin (Lederle) Refined and Concentrated

Tetanus Antitoxin, 20,000 units

H. K. MULFORD CO.

Diphtheria Toxin for the Schick Test, two 10 c.c. vial packages

PARKE, DAVIS & CO.

Tetanus Antitoxin Globulin, 20,000 units

E. R. SQUIBB & SONS

Diphtheria Toxin-Antitoxin Mixture (Sheep)-Squibb

Diphtheria Toxoid-Squibb

Parathyroid Hormone-Squibb

UNITED STATES STANDARD PRODUCTS CO.

Diphtheria Toxin-Antitoxin Mixture 0.1 L (Non-Sensitising)

TRUTH ABOUT MEDICINES

Normal Horse Serum.—A normal horse serum (New and Non-official Remedies, 1928, p. 348) marketed in packages of one syringe containing 10 c.c.; in packages of two syringes each containing 10 c.c.; in packages of one vial containing 25 c.c.; in packages of one double ended vial containing 50 c.c.; also in packages of one double ended vial containing 100 c.c. (The National Drug Co., Philadelphia.)

Diphtheria Antitoxin, Extra Concentrated.—A diphtheria antitoxin, concentrated (New and Non-official Remedies, 1928, p. 342) prepared by inoculating horses with diphtheria toxin. It is marketed in single vial packages of 1,000 and 20,000 units; in syringes containing, respectively, 1,000, 3,000, 5,000, 10,000 and 20,000 units. (The National Drug Co., Philadelphia.)

Tetanus Antitoxin.—A tetanus antitoxin, concentrated (New and Non-official Remedies, 1928, p. 356) prepared by inoculating horses with tetanus toxin. It is marketed in packages of one vial containing 1,500 units; in packages of one syringe containing 1,500 units; also in packages of one syringe containing 5,000 units. (The National Drug Co., Philadelphia.)

Antistreptococcic Serum.—A polyvalent antistreptococcus serum (New and Non-official Remedies, 1928, p. 361) obtained by immunizing horses with streptococci from various clinical sources. It is marketed in packages of one syringe containing 20 c.c. and in packages of one double ended vial containing 50 c.c. (The National Drug Co., Philadelphia.)

Vaccine Virus.—A vaccine virus (New and Non-official Remedies, 1928, p. 362) marketed in packages containing, respectively, one, five and ten capillary tubes. (The National Drug Co., Philadelphia.)

Rabies Vaccine-Human (Semple Method).—An antirabic vaccine (New and Non-official Remedies, 1928, p. 363) prepared according to the general method of David Semple (phenol killed). Marketed in sets of two packages, the first containing four 2 c.c. vials and the second containing ten 2 c.c. vials. (The National Drug Co., Philadelphia.)

Pertussis Vaccine.—A pertussis bacillus vaccine (New and Non-official Remedies, 1928, p. 376) marketed in packages of one 5 c.c. vial containing 4,000 million killed pertussis bacilli per c.c.; in packages of one 15 c.c. vial containing 4,000 million killed pertussis bacilli per c.c.; in packages of one 30 c.c. vial containing 4,000 million killed pertussis bacilli per c.c. (The National Drug Co., Philadelphia.)

Pneumococcus Vaccine.—A pneumococcus vaccine (New and Non-official Remedies, 1928, p. 379) marketed in packages of one 5 c.c. vial containing 5,000 million killed pneumococci per c.c.; in packages of one 15 c.c. vial containing 5,000 million killed pneumococci per c.c.; in packages of one 30 c.c. vial containing 5,000 million killed pneumococci per c.c. (The National Drug Co., Philadelphia.)

Staphylococcus Vaccine.—A staphylococcus vaccine (New and Non-official Remedies, 1928, p. 391) marketed in packages of one 5 c.c. vial containing 2,000 million killed bacilli per c.c.; in packages of one 15 c.c. vial containing 2,000 million killed bacilli per c.c.; in packages of one 30 c.c. vial containing 2,000 million killed bacilli per c.c. (The National Drug Co., Philadelphia.)

Typhoid Vaccine.—A typhoid vaccine (New and Non-official Remedies, 1928, p. 383) marketed in packages of one 5 c.c. vial containing 1,500 million killed typhoid bacilli per c.c.; in packages of one 15 c.c. vial containing 1,500 million killed typhoid bacilli per c.c.; in packages of one 30 c.c. vial containing 1,500 million killed typhoid bacilli per c.c. (The National Drug Co., Philadelphia.)

Typhoid-Paratyphoid Combined Vaccine.—A typhoid vaccine (New and Non-official Remedies, 1928, p. 383) marketed in packages of three 1 c.c. vials, the first dose containing 500 million killed typhoid bacilli, 375 million killed paratyphoid A bacilli and 375 million killed paratyphoid B bacilli, the second and third doses each containing 1,000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli and 750 million killed paratyphoid B bacilli; in packages of one 5c.c. vial containing 1,000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli and 750 million killed paratyphoid B bacilli per c.c.; in packages of one 15 c.c. vial containing 1,000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli and 750 million killed paratyphoid B bacilli per c.c.; in packages of one 30 c.c. vial containing 1,000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli and 750 million killed paratyphoid B bacilli per c.c.; in packages of ninety 1 c.c. vials (thirty immunizations), being thirty sets of three doses, the first dose containing 500 million killed typhoid bacilli and 375 million each of killed paratyphoid A and B bacilli, the second and third doses containing, respectively, twice the number of bacilli in the first dose. (The National Drug Co., Philadelphia.)

Typhoid-Paratyphoid A Vaccine.—A typhoid vaccine (New and Non-official Remedies, 1928, p. 383) marketed in packages of one 5 c.c. vial containing 750 million killed typhoid bacilli and 250 million killed paratyphoid A bacilli per c.c.; in packages of one 15 c.c. vial containing 750 million killed typhoid bacilli and 250 million killed paratyphoid A bacilli per c.c.; in packages of one 30 c.c. vial containing 750 million killed typhoid bacilli and 250 million killed paratyphoid A bacilli per c.c. (The National Drug Co., Philadelphia.)

Scarlet Fever Streptococcus Toxin for Preventive Immunization-P. D. & Co.—It is prepared by the method of Drs. Dick by license of the Scarlet Fever Committee, Inc. (New and Non-official Remedies, 1928, p. 392). Marketed in packages of five vials of toxin, containing, respectively, 500, 2,000, 8,000, 25,000 and 80,000 skin test doses; in packages of fifty vials of toxin, ten containing 500 skin test doses, ten containing 2,000 skin test doses, ten containing 8,000 skin test doses, ten containing 25,000 skin test doses, and ten containing 80,000 skin test doses. Parke, Davis & Co., Detroit. (Jour. A. M. A., January 5, 1929, p. 55.)

Bothrops Antitoxin.—An antitoxic serum prepared by immunizing animals against the venom of the tropical American serpents of the genus *Bothrops.* Evidence has accumulated to show that the venom of certain snakes may be neutralized by the employment of a serum obtained from animals that have been injected with venom from a snake of the same family. Bothrops antitoxin is used to neutralize the venom injected by the bite inflicted by members of the genus *Bothrops.* The serum is administered intramuscularly or subcutaneously; in cases seen late or in the presence of severe symptoms it may be administered intravenously.

Antivenin (Bothropic)—Tropical American Anti-Snake-Bite Serum.—An antitoxic serum prepared by injecting horses with venom from serpents of the genus *Bothrops,* especially of the "Fer-de-Lance" *(Bothrops atrox).* It is claimed to have neutralizing effect against the venom of the genus represented. The serum is marketed in syringes of 10 c.c. (a single dose). H. K. Mulford Co., Philadelphia.

Ephedrine Hydrochloride-Lilly.—A brand of ephedrine hydrochloride-N. N. R. (New and Non-official Remedies, 1928, p. 175). It is also supplied in the form of Pulvules Ephedrine Hydrochloride-Lilly, ⅜ grain, Pulvules Ephedrine Hydrochloride-Lilly, ¾ grain and Solution Ephedrine Hydrochloride-Lilly, 3%. Eli Lilly & Co., Indianapolis.

Tablets Ephedrine Hydrochloride-Squibb, ⅜ grain.—Each tablet contains ephedrine hydrochloride-Squibb (*The Journal,* September 1, 1928, p. 645) ⅜ grain. E. R. Squibb & Sons, New York.

Tablets Ephedrine Hydrochloride-Squibb, ¾ grain.—Each tablet contains ephedrine hydrochloride-Squibb (*The Journal,* September 1, 1928, p. 645) ¾ grain. E. R. Squibb & Sons, New York.

MacDowell's Wheat-Nut-Casein Dietetic Flour.—A flour prepared from wheat, edible nuts and casein, to which has been added a leavening mixture composed of potassium bitartrate and sodium bicarbonate and sodium chloride as flavoring. The product has approximately the following composition: protein, 28.67; carbohydrate, 28.68; fat, 18.69; ash, 5.64; fiber and pentosans, 7.59; and water, 8.49. MacDowell's Wheat-nut-casein dietetic flour is proposed for use in the dietetic treatment of diabetes and wherever restriction of carbohydrate in the diet is desired. MacDowell Brothers, Ogdensburg, N. Y.

Pirquet Test for Tuberculosis (Bovine Type).—Tuberculin-Koch (New and Non-official Remedies, 1928, p. 368) marketed in capillary tubes, put up in packages, respectively, of one tube, two tubes and ten tubes, accompanied by controls. H. K. Mulford Co., Philadelphia.

Tuberculin Ointment (Moro Ointment) (Bovine Type).—An ointment containing tuberculin-Koch (New and Non-official Remedies, 1928, p. 368) 50 per cent, with an equal part of hydrous wool fat. H. K. Mulford Co., Philadelphia.

Tuberculin Intracutaneous (Bovine Type).—Marketed in single packages of one intradermal syringe containing tuberculin-Koch (New and Non-official Remedies, 1928, p. 368) 0.2 mg. in physiological solution of sodium chloride, 0.05 c.c.; in packages of five intradermal syringes each containing tuberculin-Koch (New and Non-official Remedies, 1928, p. 368) 0.2 mg. in physiological solution of sodium chloride; and in single vial packages containing tuberculin-Koch (New and Non-official Remedies, 1928, p. 368) 0.012 Gm. in physiological solution of sodium chloride, 3 c.c. H. K. Mulford Co., Philadelphia. (Jour. A. M. A., January 19, 1929, p. 231.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of January 9, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, January 9, 1929, at 8 o'clock. Dinner was served at 7 o'clock. The meeting was called to order by the President, Dr. C. N. McCloud. There were 46 members present.

Minutes of the December meeting were read and approved.

Dr. J. E. Hynes stated that the Academy year began with the January meeting under the new Constitution, and made a motion that the present officers be ratified for the year 1929. Motion carried.

Dr. A. E. Wilcox (Minneapolis) reported a case of Esophageal Defect, and repair of same with restoration of function. The patient was presented.

Mr. B. A., age 71, married, farmer. Family history negative to malignancy.

Previous History: The patient had typhoid fever when a youth. Otherwise he was well until three years ago when he first noticed a periodical hoarseness which gradually became permanent and more marked with stenosis of the larynx, necessitating tracheotomy. Subsequent study resulted in a diagnosis of carcinoma of the larynx. In the spring of 1928 he sought advice from several sources and in May, 1928, the larynx was removed with a cautery. The esophagus was found to be involved, and that portion of the esophagus extending from a point a little above the sternum to the pharynx was sacrificed.

The patient first came under my notice in June, 1928, at which time the middle cervical region had been left wide open and was showing progressive healing by granulation. When attempting to swallow, large amounts of mucus flowed from the crater-like operated field and during the contraction of the pharyngeal muscles the epiglottis could be seen plainly in activity. The upper end of the esophagus lay exposed on a level with the upper extremity of the trachea, its mucous membrane pouting in the manner characteristic of similar mucous-lined tubes. At that time, as granulation was progressive, he was advised to wait until the cervical wound was smaller before discussing the advisability of attempting repair of the esophageal defect.

He returned to his home in Canada and reported again to me in December, 1928, having gained 16 pounds in weight, with no evidence of local recurrence, and general health good. From the time of the operation for laryngectomy per cautery in May to the time of his operation December 14, 1928, for repair of the esophageal defect, he had been fed through a stomach tube inserted directly into the esophageal opening at the base of the cervical operative area.

On December 14th he was given 1 HMC tablet at 6:30 a. m.; a second HMC tablet at 7:30 a. m. In the course of an hour he was completely narcotized and no further anesthetic was used except periodically a few whiffs of chloroform through the tracheotomy tube. The opening in the neck at this time had healed down to a point in the lower portion of the cervical region presenting an opening about one inch in diameter, the healing having taken place in the skin and superficial tissues only. The pharynx communicated with the opening and a large amount of mucus was still drained from this aperture. The upper portion of the esophagus had become attached by scar tissue with the mucous membrane everted at this point practically on a level with the manubrium sterni.

An incision in the cervical region in the midline was made extending from a little below the chin to the opening above described. The everted mucous membrane of the esophagus which had become firmly adherent to the surrounding structure and the outer wall of the esophagus, was freely dissected from its attachments. The esophagus itself was further freed by blunt dissection in the mediastinum and gradually it was found that it could be stretched upward until it came in contact with the lower portion of the pharynx and the region of the hyoid bone without much tension. The upper end of the esophagus was then attached to this region with interrupted mattress sutures of chromic catgut, and connective tissue was brought over the line of union by interrupted Lambert mattress sutures. Two lateral rents of the esophagus, about one-half an inch long, were repaired in the same manner. The surrounding connective tissue with what I took to be the sterno-hyoid muscles were then brought together in the midline in front of the esophagus and an attempt was also made to close the upper end of the trachea. The skin was closed with dermal sutures. The patient was fed through a small stomach tube for five days. Then these feedings were interrupted with periodically allowing the patient to swallow liquids and eventually to eat solid foods. About the seventh day liquids commenced to leak through the lower portion of the wound and it was obvious that an esophageal fistula had developed; also considerable mucus was temporarily discharged, particularly when the patient made muscular efforts at swallowing. These symptoms, however, rapidly disappeared so that at the present time he has practically healed and can eat and swallow routine diet, solids and liquids.

An interesting phenomenon has also developed and, in fact, developed as early as the 10th day following the operation, which consists of his exhibiting the ability of making himself understood through articulation by means of getting sufficient air into the mouth and pharynx and then, by forced expulsion, to talk in a peculiar whispering fashion, but sufficient to be understood.

Further report as regards recurrence and progress will be made in the future.

DISCUSSION

Dr. A. Schwyzer (St. Paul): I think this is an unusually pretty result which the doctor has shown us. The defects in the pharynx and esophagus are very difficult to close as a rule, as the everlasting activity

of the muscles is liable to make a fistula. I remember one case which was quite similar to this, where we could see the epiglottis on the side, and where we had to do about three operations to close it. The explanation that the doctor gives for the good voice that the man has is the explanation that you find given in these cases. The patient forms enough of a pouch in the hypopharynx and nasopharynx filled with air, and then expresses it when he begins to talk. I think this man talks better than the average after a repair of this kind.

Dr. W. P. Larson (Minneapolis) gave a talk on "The Problem of Anaphylaxis."

Dr. E. T. Bell (Minneapolis) gave a talk, illustrated with charts and lantern slides, on "Lipoid Nephrosis."

DISCUSSION

Dr. S. Marx White (Minneapolis): I wish to express the extraordinary interest that Dr. Bell's presentation arouses and express my own appreciation of the value of his study from the combined clinical and pathological standpoints. We in Minnesota are privileged to see a type and quality of work in this particular field that is unusual. I believe it is as valuable a piece of work as is being done anywhere.

I would be interested, in connection with the discussion of this paper, to hear something as to the cause of arterial hypertension—hyperpiesia—with which the arteriosclerotic kidney is associated. What we often see from the clinician's standpoint is a group of individuals with hypertension, with a familial history of hyperpiesia, and in whom (when seen early) no evidences of any form of toxemia and no evidences of renal damage can be found.

There is much to argue for a fundamental, functional disturbance of the pressor mechanism in which frequently recurring pressure increases are brought about by factors which we may, for the moment, group as emotional and which recur frequently and over many years. While there is good ground for the belief that toxic substances play a part in the hypertension of glomerulonephritis and of the toxemia of pregnancy, etc., similar grounds seem to be lacking in hyperpiesia, in which definitely toxemic states may follow the sclerosis of large numbers of renal glomeruli but do not appear to precede.

The part played by guanidine derivatives, so ably and persistently studied by Major, of Kansas, and his associates, remains to be shown. The part played by cholesterols may prove to be of interest. The high cholesterol content of the blood in certain nephroses has been brought out by Dr. Bell. In nephrosis, cholesterolemia is not usually associated with arterial hypertension. On the other hand many individuals with hyperpiesia in a stage in which there are no, or occasionally only minimal, evidences of renal damage, have cholesterol figures measurably above the normal though not very high. A few facts are at hand but they remain few and uncorrelated, so far as the causation of essential hypertension is concerned.

Dr. George Fahr (Minneapolis), in connection with Dr. Bell's paper, reported a case of nephrosis which had been studied for several years.

Dr. E. T. Bell: In answer to Dr. White's question as to how to explain hypertension, I think we have to explain that on the basis of the contraction or narrowing of the arterioles or capillaries with consequent blocking to the blood stream. The trend of opinion has been, previously, that lipoid nephrosis is a metabolic disease, but evidence shows pretty clearly that it is a disease of the kidney. I think now we have got to make out the type of injury in the kidney; that it is not a disease of metabolism.

Dr. Arnold Schwyzer read a letter which had been written to Dr. Ulrich by Dr. Hilding Berglund, who is at present in China under the Rockefeller Foundation.

The meeting adjourned.

Carl B. Drake, M.D.,
Secretary.

NEISSER (GONOCOCCIC) VACCINE AND ERYSIPELAS VACCINE (NATIONAL DRUG CO.) NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that the National Drug Co., Philadelphia, markets Neisser (Gonococcic) Vaccine and Erysipelas Vaccine. In 1924 the Council omitted from New and Non-official Remedies all gonococcus vaccines and in 1925 it omitted all streptococcus vaccines because experience with such preparations had not established their value and because the Council's consultants concluded that they had no field of usefulness. In accordance with this action, the Council declared the preparations of the National Drug Co. inadmissible to New and Non-official Remedies (Jour. A. M. A., January 5, 1929, p. 44).

TARTAROFF

This is exploited as a "marvelous discovery" that "acts like magic on the teeth"; "Tartaroff is the greatest scientific discovery of the age. Nothing like it ever prepared before. It is not a tooth paste but a simple, harmless preparation that can be applied to the teeth in a few seconds. Immediately the teeth are transformed into gems of pearl white beauty." From the analysis of the American Dental Association it appears that Tartaroff is, for all practical purposes, a mixture of hydrochloric acid and water, with a little coloring matter added. The claim that a 1.2 per cent solution of hydrochloric acid is harmless to the teeth is pernicious to a degree. (Jour. A. M. A., January 5, 1929, p. 73.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

SURGERY

SUPERVISORS:

DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

DIVERTICULA OF THE MALE URETHRA: Robert W. McKay, M.D., and J. A. C. Colston, M.D., Baltimore (Surg., Gynec., and Obst., XLVIII, No. 1, 51-62). The authors review the literature on diverticula of the male urethra and find 84 reported cases. They discuss 8 unreported and two previously reported cases.

Most writers on the subject adopt the classification of Watts, which is as follows:

A. Congenital diverticula
B. Acquired diverticula
   1. From dilatation of the urethra due to
      a. Urethral calculus
      b. Urethral stricture
   2. With perforation of the urethra resulting from
      a. Injuries to the urethra
      b. Rupture of abscesses into the urethra
      c. Rupture of cysts into the urethra

The authors add an additional heading to this list: pseudodiverticula of the urethra, urine-filled urethral pouches communicating directly with the urethra. Such pseudodiverticula result from the dilatation of normal structures in the posterior urethra due to back pressure. The old classification of urethral diverticula into true and false depending on the character of the wall of the cavity, is no longer accepted.

The symptoms depend on the location, size, depth and degree of infection of the diverticulum. They may simulate very closely those due to posterior urethritis and verumontanitis. Deep-seated perineal pain, dysuria and terminal dribbling are usually the outstanding symptoms. In diverticula situated anteriorly, a fluctuant tumor filling during urination and emptying under pressure, may be palpated.

The diagnosis is usually made by means of cystourethroscopic examination and x-ray. Various opaque media may be introduced into the diverticulum to outline it under the x-ray. Two types of surgical treatment are possible, that is, resection of the diverticulum and repair of the urethral opening of the diverticulum, and the second converting the cavity of the diverticulum and of the prostatic urethra into one. This type of surgery is possible when the diverticulum is situated in the posterior urethra. Of the authors' ten cases, seven were operated on, and one case was treated by the application of silver nitrate. In this case the opening of the diverticulum was large and provided good drainage.

Complete resection of the sac of the diverticulum with closure of the communication with the urethra was done in five of the seven operated cases. In two cases in which the cavities of the diverticula were shallow, the openings between the urethra and diverticula were enlarged to insure good drainage.

C. M. Spooner, M.D.

OBSTRUCTIVE HYDRO-URETERAL ANGULARITY WITH HYDRONEPHROSIS IN CHILDREN: Frank Hinman, M.D., San Francisco (Arch. of Surg., Jan., 1929, Vol. XVIII, Part 1, No. 1, 21-62). Hinman discusses hydro-ureter and hydronephrosis occurring in children, as a result of long continued partial obstruction. The site of the obstruction is in the lower urinary tract or in the lower ureter and may be congenital or acquired. It may occur in girls in whom no obstructive lesion can be demonstrated. Hinman differentiates the condition from megalo-ureter in which the dilatation results from atony, from hydronephrosis due to obstruction at the uretero-pelvic junction, and from the common type of hydro-ureter seen in adults in which the marked angularity is usually lacking. In hydro-ureteral angularity in children, the ureteral wall hypertrophies and elongates as well as dilates, and the angularity produced forms kinks and bends that come bound together by adhesions and collateral blood vessels. In the presence of such pathological changes removal of the primary obstruction fails to arrest the growth of the increasing hydronephrosis.

As renal repair has been shown to be more rapid and more complete in children the prognosis is better than in urinary obstruction with secondary renal insufficiency in adults. An improvement in renal function can be obtained prior to operation by continuous drainage of the renal pelvis through ureteral catheter.

Hinman calls attention to the hopelessness with which the condition has been considered in the past. Of his six operative cases the majority has shown improvement in general physical condition and an increased renal function as evidenced by an increased excretion of phenosulphonephthalein.

Hinman recommends a two-stage surgical procedure. First, nephrostomy is performed on both sides or only on the more diseased side. The upper portions of both ureters are freed, straightened, and splinted by means of the nephrostomy tubes. When the general

condition and the renal function have improved the second stage is done.

The lower ureters are freed and straightened. The lower ureter is resected, as is the ureteral opening into the bladder. The redundant portion of the lower ureter is resected and the lower end of the now shortened ureter transplanted into the bladder at the site of the resected ureteral orifice. This procedure straightens out the ureter and prevents recurrence of the angularities. Large catheters are introduced into each ureter to act as splints and to provide means of drainage and lavage.

C. Martin Spooner, M.D.

CONGENITAL ABSENCE OF ONE KIDNEY. Meredith J. Campbell, M.D., New York (Annals of Surg., Dec., 1928, Vol. LXXXVIII. No. 6. 1039-1044). While unilateral renal agenesis is usually an autopsy finding, its incidence of one in 1,610 cases makes it of practical importance to the urological surgeon. The condition is compatible with normal health. It is only when the other kidney becomes diseased that it assumes clinical importance.

Campbell reports nine cases found at autopsy and one additional case diagnosed during life by cystoscopic examination. The condition is common in the male and occurs more often in the left than the right side. The adrenal gland was absent on the affected side in four of Campbell's cases. In five cases the presence or absence of the gland was not noted. Campbell attributed the absence of the adrenal to the isolateral vascular agenesis. In some of the reported cases no evidence of blood vessels, on the affected side, was found. No information on this point was given in the other cases.

In the majority of cases there was evidence of ureteral budding. Aplasia or agenesis of the genitalia either unilateral or bilateral is commonly associated with the condition.

The solitary kidney showed compensatory hypertrophy in three cases and was apparently normal in three cases. In three cases in which death was due to uremia, extensive kidney destruction was found in the solitary kidney. During life the diagnosis can only be made by cystoscopic examination and chromoscopy.

C. M. Spooner, M.D.

GEORGE A. BREON AND SCIENTIFIC MEDICINE

No products of George A. Breon or of the George A. Breon Co. have ever been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies. George A. Breon and Co. is a concern that has carried water on both shoulders. On the one hand it appeals to uncritical and unscientific physicians with a series of prescription products that are both uncritical and unscientific; on the other hand, it has made a number of nostrums for fraudulent mail-order concerns and George A. Breon himself is reported to have been the originator of some of the nostrums. (Jour. A. M. A., January 5, 1929, p. 76.)

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

THE USE OF BISMUTH IN THE TREATMENT OF CHILDREN WITH CONGENITAL SYPHILIS: Margaret L. Bronson (Amer. Jour. of Dis. of Children, 1928, 36, 1136). The literature since 1922 has contained numerous reports of the use of bismuth in the treatment of patients with syphilis. The earlier literature contains references to general and local reactions after the use of bismuth, but reactions have apparently become less frequent.

In the administration of bismuth in this clinic, toxic effects have not been encountered.

Interstitial Keratitis.—The only active cases of syphilis in which the patients were treated with bismuth were in this group. The impression is that the acute symptoms subsided at least as quickly under treatment with bismuth as when arsenic and mercury without bismuth was used. In two cases, there was an almost immediate subsidence of symptoms. The children who were treated with bismuth seem to have recovered with less scarring of the corneas.

In regard to the Wassermann reaction of the blood, in three cases it changed from 4+ in both antigens to negative, and in all cases it changed to weaker reactions.

Syphilis of the Central Nervous System.—In one case, after five courses of bismuth, the Wassermann reaction of both the blood and the spinal fluid became negative. The spinal fluid of the second child was completely negative after the third and fifth courses of bismuth, and the Wassermann reaction of the blood had become 1—4. After the sixth course of bismuth, the Wassermann reaction of the blood was negative. The child's Wassermann reactions on the spinal fluid and blood were 4+, and the gold curve was positive after the third course of bismuth.

Fixed Wassermann Reaction.—There are nine children whose Wassermann reactions were not changed by routine treatment with arsenic and mercury. The result of treatment with bismuth has been a change of the Wassermann reaction in eight cases. In three, it became completely negative, and in five 0—4.

R. N. Andrews, M.D.

JUVENILE ACRODYNIA: C. W. Wyckoff, M.D. (Amer. Jour. Dis. of Children, January, 1929, page 88). The disease affects infants and young children mainly between the ages of 12 months and 4 years, and is characterized by extreme fretfulness, marked neuromuscular disturbances, sleeplessness and a dull red or

pink rash of varying character sometimes over the entire body, but involving mainly the hands and feet.

As to the question of a disease due to a deficiency in food, this may be ruled out from the facts that in the majority of cases the diets had been perfect. Living conditions do not have any bearing on the condition; in fact, in most cases the diet and surroundings have been perfect, and the disease has occurred in both rural and urban sections.

Observers have not found anything abnormal in the microscopic examination of the blood, except a leukocytosis ranging from 10,000 to 40,000, a fact which certainly indicates an infectious process.

While lying down, the child's head is buried in a pillow, face down; when sitting, the body is in a crouching position, the head and trunk bent forward, so that the abdomen may rest on the thighs. The picture is that of most abject wretchedness.

Profuse sweating is almost always present, giving the skin a cold, clammy feeling. The hair comes out easily, either falling out or being pulled out by the child in its nervous, negative mental attitude. Likewise, the finger-nails or toe-nails may fall off, leaving no sign of an inflammatory condition. The teeth also become loosened and may fall out from constant grating, the gums showing no visible pathologic condition. Anorexia is another constant symptom and the most serious of all. Asthenia is also a symptom. The child sufferers from a dull, nagging pain of some description, and this is most likely a peripheral neuritis, as suggested by Byfield, Peterson and Greenfield. The condition is a peripheral neuritis involving mainly the sensory nerves and showing marked vasomotor disturbances of the extremities.

Rodda claims fairly prompt cessation of symptoms by excising the tonsils and adenoids, if the cases are not far advanced. For the nervous symptoms, sedatives or hypnotics are useless. For the skin eruption and itching, calamine lotion profusely applied gives considerable relief. If the anorexia is complete, gavage should be resorted to and continued sometimes for many weeks.

R. N. Andrews, M.D.

SUBACUTE BACTERIAL ENDOCARDITIS IN CHILDHOOD: William L. Rost, and Alfred E. Fischer (Amer. Jour. of Dis. of Children, 1928, 36, 1144). All statistics show that rheumatic fever is the chief predisposing factor in the development of subacute bacterial endocarditis. Lenhartz, Libman and Schottmüller were among the first to associate nonhemolytic streptococci with subacute bacterial endocarditis.

The early manifestations may be those of a low grade toxemia with an insidious onset, the patient complaining of lassitude, anorexia, pains in the extremities, which are fleeting at times, feverishness, chilliness, headache and occasionally cardiac discomfort. The onset may be more abrupt and acute with high fever, chills and sweats. Later, pallor and curious pigmentation (café au lait) of the skin, particularly of the face, and emaciation are present. Tenderness of the lower sternum, clubbing of the fingers and toes, and swelling of the joints occur, and, as the disease progresses, embolic phenomena appear, such as petechiæ (white centered) on the conjunctivæ, face or upper portion of the chest. Abdominal pain, which occurs most frequently in the left hypochondrium, splenic tenderness and enlargement of the spleen and liver are frequently present. Tender nodules about the pads of the hands, fingers and toes (Osler nodes) are pathognomonic except for their rare occurrence in cases of atypical verrucous endocarditis (Libman and Sacks). An organic cardiac murmur, of course, is quite essential. The finding of large mononuclear cells, the so-called macrophages or histiocytes, in a blood smear taken from the lobe of the ear, the presence of red blood cells in the urine and finally the isolation of a non-hemolytic streptococcus from the blood stream are valuable laboratory aids.

The duration of this malady varies. It depends on the virulence of the infection and the general condition of the patient.

The patient suffering from subacute bacterial endocarditis often looks well in contrast to the rheumatic patient, because there is less involvement of the myocardium and usually decompensation is not present.

Fibrinous pericarditis during the course of subacute bacterial endocarditis is rare.

Hematuria is usually present in subacute bacterial endocarditis and is rare in rheumatic fever.

In general, it may be stated that the prognosis is extremely grave.

R. N. Andrews, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

VIRGIL J. SCHWARTZ,
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DENTAL CARIES IN PARANASAL SINUS INFECTIONS: Gordon Berry (Arch. of Otolaryng., 1928, VIII, 698). The frequency of dead or abscessed teeth in patients with paranasal sinus disease is very impressive. A dentist can often step in and remove a tooth and the patient proceed to get well.

Examination of a series of specimens in the Harvard laboratories reveals that there are two main classifications of the maxillary sinuses: (1) those with small cavities and thick floors, (2) and those with large cavities and thin floors—the latter group being much the greater. In the small antrum class the roots of teeth are at some distance from the cavity, while in the large antrum type the dental roots mount up into or straddle the floor. In some specimens the floor of the large antrum is only one-sixteenth of an inch thick.

In a typical film of a dental abscess the infection has gradually eaten away sufficient bony tissue to show

rarefaction. In the region of the antrum by its very nature there is little or no bony absorption before the infection reaches the antrum itself.

The crux of the whole argument is that a dead tooth which in the film is seen to reach or extend near to the floor of an antrum is an active menace which must be carefully watched and seriously considered. The trouble will often not be apparent in the dental film. This infection may escape into the antrum and thence through the ostium into the nose. The general conclusion may be reached that one may look to this source for a considerable portion of those nasal difficulties which have been recorded as chronic rhinitis, nasal polypi, chronic anterior ethmoiditis and some vasomotor forms.

Further, a dead or dying tooth in close proximity to the antral floor, no matter how harmless it appears, is a threat. Recurring pains in the antrum on this side, an occasional seepage of pus from the middle meatus, small polypi in this region and even a chronic unilateral nasal congestion otherwise unexplained, should attract attention to the teeth or to a possible buried root. The observation and removal of such a nearby septic focus will clear up many a stubborn nasal and paranasal condition. This claim is reasonable and it has the support of experience.

Arthur C. Dean, M.D., F.A.C.S.

FOREIGN BODIES IN THE STOMACH AND IN THE INTESTINES: M. C. Myerson (Arch. of Otolaryng., Vol. 8, No. 6, December, 1928). Myerson cautions against haste in performing gastrotomy for foreign bodies in the stomach. Even open safety pins, which are not uncommonly swallowed by infants, usually pass unhindered through the entire alimentary canal. Roentgen studies have shown that foreign bodies usually traverse the intestinal tract with the heavier end foremost. Open safety pins almost invariably are propelled along the tract with the closed end first. Myerson reports a series of 39 cases of foreign body in the alimentary tract, 32 of which were pointed. Thirty-six passed with the stool; three were removed surgically. One of the three died, apparently from operative shock.

Gastrotomy performed on infants is usually attended with heavy operative risk. Failure of a foreign object to pass promptly does not necessarily call for surgical interference. Gastrotomy should be done only when signs of perforation develop, or when a large body will not pass the pylorus. Cases are cited where needles, nails, pins, coins, etc., have been retained in the intestinal tract for weeks, and even months. Gastroscopy should be resorted to when possible. The administration of pulpy and starchy foods, to encase pointed foreign bodies, is of questionable value. While most of such cases receive cathartics apparently without ill effect, the practice may be harmful.

Thomas Myers, M.D.

LATENT DISEASE OF THE MAXILLARY SINUS: Dr. William Mithhoefer (The Laryngoscope, 1929, XXXIX, 1). That latent disease of the maxillary sinus is of frequent occurrence is not generally believed, according to the author; but his experience shows that many times this cavity is mildly or markedly involved without any nasal symptoms. This pathological change consists of edema of the mucous membrane which often progresses to an atrophic, pyogenic, or even hyperplastic variety of mucous membrane.

The marked involvement of general health of many patients, and the rapid gain in weight, following the radical removal of diseased antrum tissue from an unsuspected maxillary sinus is proof that chronic toxemia from this cavity is often a sufficient reason for the patient's ill health.

The author emphasizes the necessity of the careful examination of every maxillary sinus where there is present a hyperplastic ethmoiditis. His best results have been obtained where the presence of a latent antritis was recognized prior to ethmoid exenteration and a radical antrum operation was done at the time. Many individuals who have recurrent attacks of acute symptoms which subside on routine treatment by a rhinologist are found, upon careful examination, to be suffering with latent, chronic antritis.

X-ray diagnosis must not be depended on too much. The author has found marked hyperplasia in the deep recesses of the antrum in patients with a clean skiagram and a negative lavage. In those doubtful cases lipiodol instillation furnishes a further means for diagnosis.

The conditions that should cause the rhinologist to suspect latent chronic antritis are:

(1) Repeated vasomotor disturbances of the nasal mucosa.
(2) Hyperplastic ethmoiditis.
(3) Protrusion of the membranous middle meatal wall.
(4) Polypoid changes of the inferior turbinal especially in its posterior third.

The author also reached the conclusion that chronic antritis is often responsible for many of the symptoms of hay fever, and that antrum irrigation with hypertonic saline solution during the attack will often bring immediate relief.

Arthur C. Dean, M.D., F.A.C.S.

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MINNESOTA MEDICINE

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MINIMAL PULMONARY TUBERCULOSIS—ITS DETECTION

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ALTHOUGH we sometimes speak of tuberculosis control as one of the great achievements in medicine, there is still much to be achieved. Not so long ago physicians and others were of the opinion that the eradication of tuberculosis was largely a matter of scouring the country for the minimal (incipient) cases, and building institutions to cure them. Many such institutions were built, but troubles loomed, when their doors were thrown open, that had never been dreamed of. There appeared a deluge of advanced cases and a rarety of minimal cases. What was wrong?

1. *Significance of pleurisy with effusion and pulmonary hemorrhage was not generally understood.* Many cases of pleurisy with effusion were diagnosed idiopathic pleurisy, treated by limiting motion of chest wall and administering narcotics and sent back to work without a word of warning. Many cases of pulmonary hemorrhage had the "bleeding point" sought in a tonsil and were advised to return to work the next day. In other words, pleurisy with effusion not accompanying or following pneumonia, or other acute nontuberculous conditions, and pulmonary hemorrhage were not generally recognized as often being first manifestations of tuberculosis. The result was that those cases who were so unfortunate as to have no other early manifestations came for re-examination months or even years later only to be told that they were suffering from advanced tuberculosis. I have recently seen a man of thirty-one years who had pleurisy with effusion in 1915. Apparently there was no other definite manifestation of the disease until 1926, when he developed pain in a knee joint. This condition gradually grew worse, and tuberculosis was found to be present in the joint. An examination of the chest revealed advanced tuberculosis of both lungs with cavity formation. His prognosis now is extremely bad.

A good example of pulmonary hemorrhage as a first manifestation is the case of a high school girl who in November, 1927, expectorated a mouthful of blood following cough precipitated by violent laughing. She returned to school the next day and graduated the following June. No other manifestations of tuberculosis appeared until September, 1928, when she had a profuse pulmonary hemorrhage. She was then found to have advanced pulmonary tuberculosis.

It will not suffice for only the medical and closely allied professions to know the significance of pleurisy and pulmonary hemorrhage. The public must also know. Every child should become as familiar with these facts as with the multiplication tables. In the past many such cases have not even been called to the attention of the physician, until advanced disease was present.

2. *Reflex symptoms were not generally understood as early manifestations.* By reflex symptoms we usually mean those that occur along the vagus nerve either below or above the lungs. Perhaps the two of which patients most frequently complain are those referable to the gastro-intestinal tract and the larynx. Either of them may be the first evidence of pulmonary disease. For such cases, in the past, various forms of treatment, from diet and the simplest medication to major surgery, have been applied only to find later that there was no disease in the digestive system, but the unsuspected pulmonary lesions had become very extensive. For reflex

hoarseness of voice and tickling in the larynx vast numbers of tonsils have been removed and many months lost in applying, to the inside of the larynx, various kinds of drugs. The trouble was not in the larynx, but when detected was advanced disease in the lungs. Reflex symptoms from the lungs exist just as truly as from other parts of the body. When satisfactory evidence to account for these symptoms can not be found in the gastro-intestinal tract or the larynx, the chest should be carefully examined without delay. At that time the lung lesion may be minimal.

3. *Significance of the insidious onset was often overlooked.* All too often we were guided by the general appearance of those who sought examinations, overlooking the fact that a chronic tuberculosis may be progressive for many months and even years in the lungs of persons who appear to be in perfect health. Such patients have slight or no symptoms, and may have been working at their usual occupations in a one hundred per cent way. If slight symptoms caused the patient to report for examination they were not given sufficient consideration. The patient may even have been told that he looked too well to have anything wrong with his lungs, and went aways feeling somewhat embarrassed because he had been oversolicitous about his health, or he had a false sense of security and did not report again until months or years later when extensive disease was present.

We must not overlook the fact that a great many people with insidious onset ignored any symptoms they may have had, and were not examined until the disease was advanced. This happens every year even with trained health workers, and probably has been the chief cause of so much advanced tuberculosis. Rathbun examined six hundred apparently healthy officers and men on board a ship returning from France. He found cases of tuberculosis among them. He later examined a large group of high school students and found unmistakable tuberculosis even in some of the most active athletes.

To prevent tuberculosis from becoming advanced in this group of patients is a difficult task. Many have refused and others will continue to refuse to accept the diagnosis and treatment until their disease is so advanced that they are extremely ill. We must never lose an opportunity to examine most carefully the chests of all persons who report for examination. For those who have no symptoms or those who ignore slight symptoms the only satisfactory method would be to make chest examinations universal. This in our present stage of health development is impossible.

4. *Massive disease was generally believed to be of long standing.* When cases of extensive tuberculosis were found someone was blamed. Either the patient was reprimanded for not having reported sooner for the first examination or the physician was criticized for not having detected the disease on previous examinations. Many believed that all cases of pulmonary tuberculosis begin with a very small lesion which slowly develops. This is true of the insidious onset type, but not all cases have that kind of onset. Careful study of cases has proved beyond doubt that a considerable number of tuberculous patients have massive involvement at the beginning of their disease. Lungs in which careful examination reveals no evidence of disease may be found extremely involved with tuberculosis a few weeks later. I know of no solution for this problem. Such cases will continue to come to us with advanced disease.

5. *Physical examination was thought to be infallible.* The patient who had no abnormal physical signs usually was told that his chest was clear, and that no further search for disease was necessary at that time, although he may have then been suffering from any stage of the disease, even the advanced. It was well known that central pneumonia might exist without causing definite physical signs, but very few thought of tuberculosis in the same way. It has been only twenty years since the cause for the difference in physical signs elicited over the two apices in the normal chest was explained by Fetterolf. Before that time I have no doubt that many physicians were misled by the signs over the right apex and diagnosed tuberculosis when it did not exist. It is a quite well established fact that when a pulmonary lesion lies four centimeters or more from the lung surface, examination by percussion and auscultation usually affords us no help. This is one reason so many people passed life insurance examinations and were granted standard policies, or in periodic health examinations were told that the lungs were in excellent condition, when in reality they had definite pulmonary lesions. Many lesions

located near the chest wall were detected by physical examination, but even some of such lesions were missed. Every chest examiner knows how chagrined he has been on more than one occasion to see definite evidence of tuberculosis on *x*-ray films or to find tubercle bacilli in the sputum of a patient whom he found negative to physical examination the preceding day. This is said to have happened even to Trudeau. Therefore, when we depended upon physical examination alone, we failed to detect many cases of tuberculosis until their disease had become advanced. We are fortunate now in having had developed aids to the physical examination which render chest studies far more valuable than they were in the past, both to the patient and the physician. These aids, however, must be properly used; if not, they may even be misleading.

6. *Diagnosis was not made until tubercle bacilli were found.* After Koch described tubercle bacilli and taught that they are always present in tuberculous lesions, there developed among physicians a reluctance to diagnose tuberculosis until the bacilli could be demonstrated. This attitude might have been expected, but it was a terrible mistake—one which has not been completely rectified even to this day. Even in the presence of history of exposure, physical signs, and other evidence of disease, diagnoses of tuberculosis were withheld, patients were told that they had bronchitis, etc., because bacilli could not be demonstrated. What a price the human family paid! Minimal cases were allowed to become advanced and moderately advanced cases became far advanced. Persons whose disease had not broken down continued untreated until bacilli were found and were being disseminated to others. Can we criticize these physicians of three and four decades ago for this action? We can not, because they were acting in the light of the best knowledge available. Later studies showed, however, that tubercle bacilli can be demonstrated in sputum of only about one in three of the minimal cases of tuberculosis. That means that if we postpone diagnosis until bacilli are found approximately two-thirds of our patients have developed advanced disease. Further studies showed that inability to demonstrate the presence of tubercle bacilli on a single or even several examinations does not affirm the absence of tuberculosis. Parts of a specimen collected today may contain no bacilli; other parts may have an abundance of them. An entire specimen collected today may contain no demonstrable tubercle bacilli while a specimen collected tomorrow or next week may be teeming with them. Even negative animal inoculation is not always conclusive evidence of the absence of tuberculosis.

7. *The use of the x-ray was too limited.* It was about thirteen years after Koch reported his work on the demonstration of the tubercle bacillus that Roentgen presented the *x*-ray. Following this was a period of years required for development of *x*-ray equipment and technic. In fact, such development is still in progress. Therefore, it is only within recent years that the *x*-ray has been of much help in diagnosis of minimal tuberculosis. The fluoroscopic examination is helpful in many phases of chest work, but can not be depended upon in the diagnosis of early tuberculosis. The *x*-ray film should be made a routine part of every chest examination. In order to be of real value in diagnosis proper technic must be used. Over-exposure of a film may completely "burn out" minimal lesions, while under-exposure may lead to misinterpretation. The physician who is not equipped with the most modern *x*-ray appliances and whose technician is not well trained should never make *x*-ray pictures of the chest with the thought of diagnosing minimal tuberculosis. He not only wastes the patient's money and his own time in a good many cases, but his diagnosis may cost the patient a long period of invalidism or even life. *X*-ray film should, in my opinion, always be interpreted by a physician well trained in interpretations. I know of only one or two exceptions to this statement in this country which seem to me to be justified. Within the last six weeks, a woman came to me carrying an *x*-ray picture, and told the history of her husband's illness. It appeared that he had had colds, and a cough had persisted longer than was usual with him. She had taken him to an *x*-ray laboratory operated by a layman, who interpreted the *x*-ray films. A glance at the films of this man's chest was sufficient to convince a physician that the technic had been carried out by an amateur, and the verbose typewritten report was even worse. There was a calcification, about the size of a quarter, in one lung hilum upon which great emphasis was placed. Tuberculosis was read into practically every lobe of the patient's lungs.

A cavity was described in the base of one lung, which in reality was a misinterpretation of calcification in the costal cartilages. This "expert" informed the wife that her husband must become a strict bed patient and as soon as possible be sent to a sanatorium. When she was asked about her husband's temperature, she told me that it was terribly high, some days registering as much as 99.2. Examination of this patient at a later date revealed no evidence of clinical tuberculosis, but I have had a hectic time convincing the family of the worthlessness of the first *x*-ray.

Well made and properly interpreted *x*-ray films of the chest are second only to the finding of tubercle bacilli in the diagnosis of tuberculosis. In cases where the physical examination fails, the *x*-ray may show unmistakable evidence of tuberculous lesions. This is not a rare occurrence. In fact, many minimal lesions are detected today, which without the *x*-ray examination would develop into advanced disease before a diagnosis would be made by other methods. In tuberculosis work this is a very significant fact, for so often lesions may be detected before they have broken down the tissues and before tubercle bacilli are being discharged from the body. In fact, this is the way Rathbun, Opie, McPhedran and others have found cases of pulmonary tuberculosis among high school girls and boys, who apparently were enjoying excellent health. We must not get the impression that the *x*-ray is infallible; even with the best technic and the best interpreation, errors occur. But, we are safe in concluding that no examination of the chest is complete that does not include well made and carefully interpreted *x*-ray films.

8. *The prevailing type of tuberculosis in childhood was not generally recognized.* Between the ages of two or three years and ten or twelve years, it has been known for some time that the mortality from tuberculosis is very low. However, the incidence of tuberculous infection was known to increase. Physicians very carefully examined suspected children's chests for pulmonary tuberculosis. In most cases they elicited no evidence of disease in the lungs of these children, and all too often told the parents that they did not have tuberculosis. Here again we must not criticize them for they were working in the light of the best knowledge of that time. But with the advent of the *x*-ray and the intelligent use of the cutaneous tuberculin test it was shown that tuberculosis is quite common during this age period. However, it usually is not of the pulmonary type. It involves the lymph nodes, which in the chest are located so remotely from the surface that ordinarily physical examination is of no avail. Chadwick of Massachusetts, Rathbun of New York, and others have found in large numbers of children examined that between three and four per cent are suffering from tuberculosis of the lymph nodes. The group of nodes that have been found most commonly involved is the hilum group. Observations of children over a period of years led Rathbun to state that he believes one in eight of such children develop the adult and destructive form of pulmonary tuberculosis during the teen-age period. Thus it is obvious that without detection of the lymph node type of tuberculosis and no treatment of the cases many later developed advanced tuberculosis.

It would seem a hopeless task to *x*-ray all the girls and boys of this age period of the country. In fact, this is not necessary, since we have come to know that tuberculous infection is by no means universal even among adults, and averages well under fifty per cent among children of the age period. It would suffice to apply cutaneous tuberculin tests to all children and proceed with a complete examination including *x*-ray films only of those children who react positively to the tuberculin test. In some rural communities, this number, as shown by Slater of Worthington Minnesota, would not amount to more than eleven per cent of the children. In the larger cities in Chautauqua County in New York, Rathbun found only forty-one per cent reacting positively to tuberculin. McCain of North Carolina found less than thirty per cent of the children with evidence of infection. Therefore, our problem among children is not as large as we had formerly believed it to be, but its proper solution is one secret of preventing advanced tuberculosis in later life.

These are some of the chief reasons why a deluge of tuberculous patients with advanced disease appeared at the doors of institutions. The National Tuberculosis Association informs us that still eighty-four per cent of the patients who report for treatment are suffering from advanced disease. Among the remaining sixteen per cent there are a good many cases who are proved to

have non-tuberculous conditions. The Early Diagnosis Campaign of the National Tuberculosis Association this month is doing much to educate the people regarding tuberculosis in general and early diagnosis in particular. Many are reporting to physicians who will not be satisfied with anything but very complete examinations. If they do not get them their confidence in the medical profession will be diminished. If they do get them their confidence will be increased and many cases of minimal tuberculosis will be detected.

CLINICAL EXPERIENCES WITH ECLAMPSIA*

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THE purpose of this paper is to give a brief discussion of some of the phases of eclampsia as they concern a physician in general practice and to present a few cases representing different types of cases.

The most common finding in the toxemias occurring late in pregnancy is hypertension, but obviously not all cases of hypertension in pregnancy are eclamptic. Cases of hypertension in pregnancy may be roughly divided into three groups:

1. A relatively benign type occurring early in pregnancy characterized by gradual rise in arterial tension but with little evidence of serious intoxication. These are the so-called nephroses of pregnancy.

2. A late malignant type occurring with sudden unheralded onset, rapid rise in arterial tension and evidence of marked intoxication, quickly becoming true eclampsia, with hepatic as well as renal and vascular damage.

3. Hypertension in pregnancy with pre-existing vascular and usually renal disease. In this group are included those with definite complications such as toxic goiter, cardiac disease, acute infections and the like.

In considering eclampsia, I think it is very essential that we first consider prenatal care. F. W. Rice in reviewing a series of 222 cases of eclampsia found that only 7 per cent had had adequate prenatal care. I feel that if we want to reduce the incidence of eclampsia we must do more than we have done in educating the laity to the need of prenatal care. It has been my experience that about 50 per cent of my obstetrical cases do not consult me until less than a month before confinement and about 20 per cent of these I do not see at all before confinement. For some reason, we are not impressing any large percentage of the people with the need of prenatal care. Nor are these people entirely of the uneducated class. As an example, about three years ago, one of our leading citizens, a college graduate and a very capable man, casually informed me that he was going to call me in about three weeks to attend his wife in confinement. I told him to bring his wife to the office for an examination. He said he did not think she needed any examination, and, furthermore, he was sure she would not consent to come in. I then told him of the need of prenatal examinations, and also told him that if she would not come in I was going out to see her. They finally consented to let me do that.

As medical men, we are inclined to blame the public for not consulting us sooner, but I believe some of the blame rests with us. Not long ago, I had ocasion to talk with a woman who had recently successfully weathered a severe type of eclampsia (convulsions about every one-half hour for twenty-four hours). I asked her why she had not consulted a doctor before she was confined. She said she had gone to one but that he told her there was no need of an examination or urinalysis so long as she was feeling all right. He told her to go home and not worry.

In my practice, I explain to my patients the need of frequent blood pressure readings and urinalysis and insist that they report at certain set dates. Then, when I find any evidences of beginning toxemia I tell the patient and her husband very candidly the dangers that lie ahead. I do this for two reasons: (1) to protect myself; and (2) because I have found by very sad experience that if you do not tell them the dangers they are apt to disregard your instructions. Occasionally, if I do not think that they comprehend the gravity of the situation, I cite cases that they knew have lost their lives in eclampsia. This never fails to get them to coöperate.

As to the management of cases that some weeks before term begin to have slight subjective symptoms with increased arterial tension, with or without albuminuria, it depends upon the response you get to treatment. I restrict their protein diet, prescribe Epsom salts by mouth, stop their work and watch them for a few days. If their blood pressure comes down and their symptoms clear up, I try to carry them along until term. If they do not respond to this treatment, I put them to bed, allow only milk and push the salts to the point of five or six watery

*Presented before the Southern Minnesota Medical Association, Rochester, Minnesota, October 2 and 3, 1928.

stools a day. It has been my experience that in practically every case that is discovered early this will reduce the blood pressure, decrease the albumin and carry them through.

Occasionally, however, you will find a case with marked evidence of toxemia. The cardinal symptoms are headache, dizziness, visual disturbance, decreased urine output, edema and epigastric pain. Usually the blood pressure will be over 160. These are the cases that have not been having adequate prenatal care. The question then arises as to whether or not we should empty the uterus at once, and, if we should, how? In answering this question, a great deal depends on the type of patients you are dealing with and also the degree of toxemia present. However, the trend of practice is swinging to conservative treatment. This is also true in cases of actual eclampsia. In my own practice, I have never emptied the uterus except when active enclampsia existed.

There are various methods in vogue for the control of toxemia of these cases. Probably the one in most popular use is magnesium sulphate either intravenously or intramuscularly. Lazard† says that he is of the belief that magnesium sulphate intravenously does not exert any deleterious action on the blood nor produce any pathological changes in the liver but on the contrary, in active eclampsia, by relief of toxemia, has a beneficial effect on the blood. It is used in a 10 per cent solution, the usual dose being 20 c.c. Besides relaxing the voluntary muscles and controlling the convulsions, it has a marked diuretic effect, thus eliminating the toxins. Dorsett prefers to give it intramuscularly. He uses 15 c.c. of a 25 per cent solution and repeats it every hour if necessary.

Another drug that seems to be worth trying is ammonium chloride. It is given largely for its diuretic effect. It is given by mouth and its use is generally followed by prompt diuresis, disappearance of edema, lowered blood pressure and general improvement. My experience has been that it is apt to irritate the stomach, and is best given in capsule form.

Concerning the management of cases of active eclampsia, I find that more and more men are becoming convinced of the value of conservative treatment. Williams‡ reports a series of 275

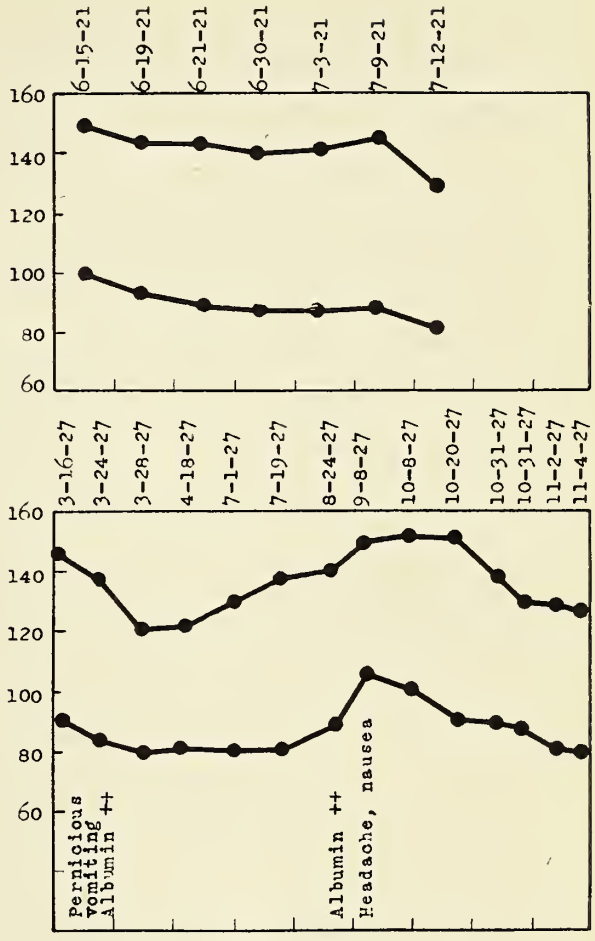

Fig. 1. Case 1.

cases. These are divided into two series of 110 and 165, according as they occurred prior to or after 1912. Up to that date, in accordance with the prevailing practice, the primary object in treatment was the promptest possible delivery of the patient, with the result, if the cervix was not fully dilated, that accouchement forcé, or vaginal or abdominal section was frequently resorted to. With this plan, their mortality was 24.8 per cent. Since 1912, he has become more conservative, and has tended to defer operative intervention until the cervix has become completely dilated. He also relies a great deal on venesection. With this method, he has reduced his mortality to 13 per cent. He thinks that a good many of the deaths that have occurred with the radical treatment are due directly or indirectly to the anesthetic.

CASE REPORTS*

Case 1.—Third pregnancy.

June 15. 1921. First examination. Age 26. Last

†Lazard, E. M.: Am. Jour. Obst., 13:720 (June) 1927.

‡Williams, J. W.: Jour. Am. Med. Assn., February, 1927.

*In the charts illustrating each case the upper line indicates systolic pressure; the lower line, diastolic pressure.

menses Oct. 1, 1921 (8.5 months). Complained of headache, dizziness, nausea and pain in the epigastrium. Blood pressure, 150. Urine: Albumin + + + +, granular casts, leukocytes and red blood cells.

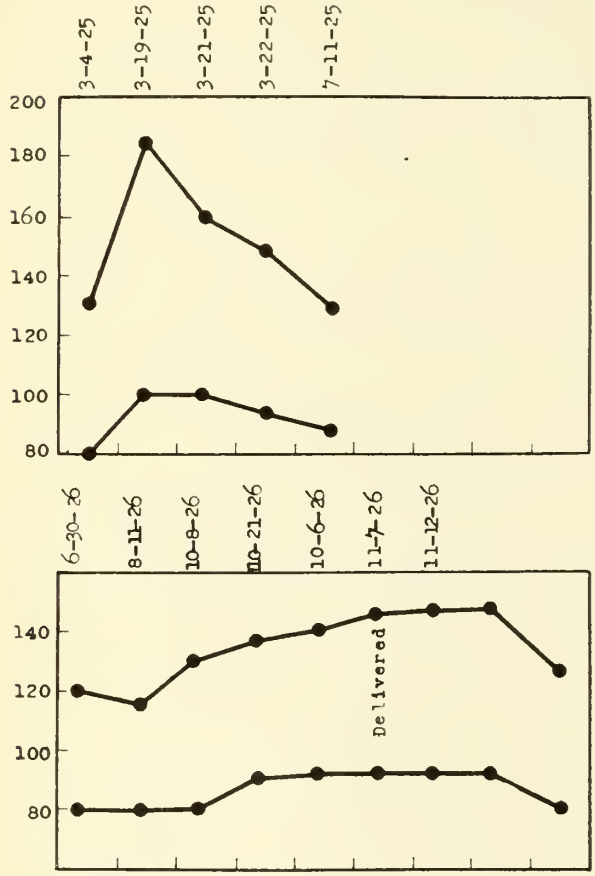

Fig. 2. Case 2.

June 19, 1921. Blood pressure 145-95. Albumin + +.

June 21, 1921. Albumin +.

July 3, 1921. Normal delivery.

July 12, 1921. Blood pressure 134-80.

Fourth pregnancy.

March 16, 1927. First examination. Age 31. Last menses Jan. 25, 1927. Pernicious vomiting, albumin + +, blood pressure 144-90. Ordered to bed for two weeks. Blood pressure dropped and albumin decreased.

July 1, 1927. Blood pressure and albumin again increased.

Sept. 8, 1927. Blood pressure 146-106. Headache. Diet limited to vegetables.

Oct. 18, 1927. Blood pressure 150-100. Headache and nausea. Put to bed, magnesium sulphate by mouth and milk diet.

Oct. 31, 1927. Normal delivery. Blood pressure 138.

Nov. 4, 1927. Blood pressure 130-80.

Case 2.—Third pregnancy.

Age 27. First seen three weeks before delivery, May 7, 1923. Blood pressure and urine normal.

Fourth pregnancy.

March 4, 1925. First examination. Age 29. Last menses July 6, 1928 (8 months). Blood pressure and urine normal.

March 19, 1925. Edema of hands and feet. Very

Fig. 3. Case 3.

nervous, unable to sleep. Headache and dizziness. Blood pressure 185. Albumin + +. Treatment: Magnesium sulphate by mouth, milk diet, put to bed.

March 21, 1925. Normal delivery.

March 22, 1925. Blood pressure 150-90.

July 11, 1925. Blood pressure 130-90.

Fifth pregnancy.

June 30, 1926. First examination. Age 30. Last menses Feb. 15, 1926 (4 months). Blood pressure 120. Urine normal.

Oct. 24, 1926. Blood pressure 140-90. Urine normal. Diet restricted to vegetables.

Nov. 4, 1926. Blood pressure 144. Albumin +. Headache and dizziness. Magnesium sulphate by mouth. Milk diet. Ordered to stay in bed.

Nov. 7, 1926. Normal delivery. Blood pressure 144-90. Baby spastic, fontanelle began to bulge in 12 hours, death occurred in 24 hours from cerebral hemorrhage.

Summary.—Eclampsia was barely escaped in fourth pregnancy. In the fifth pregnancy the patient profited

by her previous experience, consulted a physician early and her blood pressure did not go as high.

Case 3.—First pregnancy.

April 16, 1926. First examination. Age 19. Last menses Dec. 3, 1925. Neuromuscular pains in arms

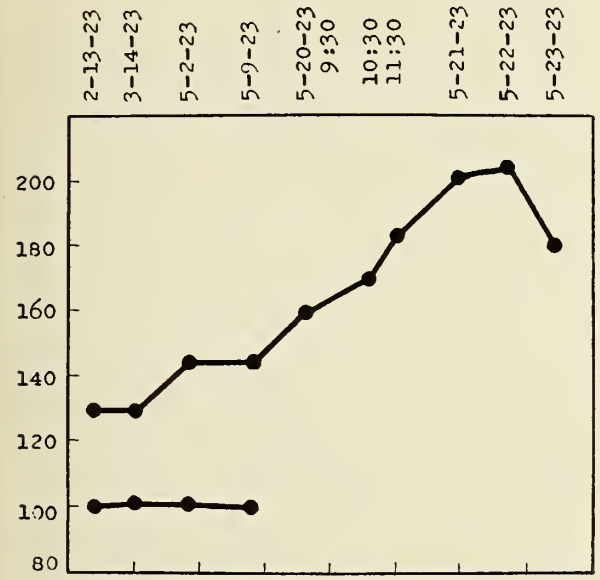

Fig. 4. Case 4.

and hands. Urine and blood pressure remained normal until eighth month.

Sept. 8, 1926. Headache, edema of feet and hands. Blood pressure 148-100. Albumin +. Milk diet and magnesium sulphate t.i.d. ordered.

Sept. 12, 1926. Blood pressure during labor 180-120. After delivery 160-108.

Second pregnancy.

Miscarriage at four months. No evidence at toxemia.

Third pregnancy.

Excessive vomiting occurred for three months with increased blood pressure but no albumin.

June 18, 1928. Last menses Dec. 14, 1927. Blood pressure 152. Trace of albumin.

June 23, 1928. Blood pressure 166. Nervous, dizzy, albumin + +. Magnesium by mouth. Rest ordered.

June 29, 1928. Patient up and about without permission. Blood pressure 150-108. Albumin +.

July 7, 1928. Headache, dizziness, visual disturbance, edema. Blood pressure 164-114. Albumin + + +. Ordered to bed.

July 10, 1928. Blood pressure 164-110. Delivered without incident. Salts and milk diet continued.

Aug. 3, 1928. Blood pressure 130-84. Albumin + +. Satisfactory convalescence.

Case 4.—First pregnancy.

Feb. 13, 1926. First examination. Age 18. Last menses Aug. 12, 1922 (6 months). Had influenza during sixth month.

March 14, 1923. Blood pressure 130-100. Pulse 124. Digitalis and magnesium sulphate by mouth.

May 9, 1923. Blood pressure 144-100. Pulse 90. Ordered to bed. Magnesium sulphate by mouth.

May 17, 1923. Headache persistent (did not take salts).

May 20, 1923. 9:30, having labor pains. Blood pressure 160; 10:30, blood pressure 170. Cervix dilated two fingers' breadth; 11:30 blood pressure 184. Cervix dilated three fingers' breadth; 11:45, first convulsion. Medium forceps delivery immediately following.

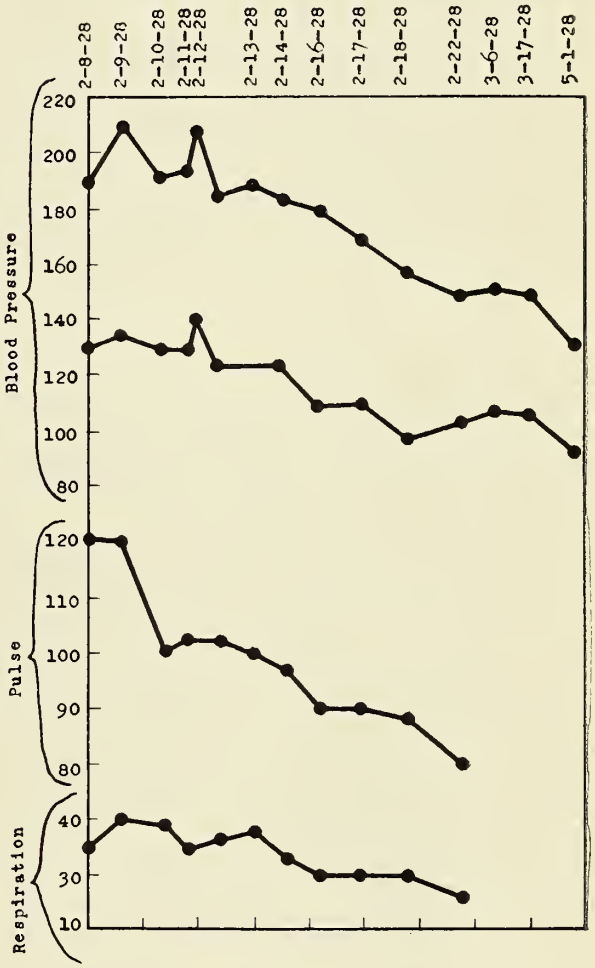

Fig. 5. Case 5.

Convulsions continued and became more frequent, coma intervened, generalized edema developed rapidly. Pupils became dilated and failed to react. Anuria followed. Sweating increased frequency of convulsions. Magnesium sulphate given by stomach tube. Five hundred c.c. blood withdrawn and replaced by saline. Twenty-four hours later urine voided, albumin + + + +. Consciousness regained in 36 hours. Intravenous saline repeated. Convulsions ceased 48 hours after first convulsion. Albumin persisted for 3 months.

Case 5.—Third pregnancy.

Feb. 8, 1928. First examination. Age 38. Has one child aged 16. Had one miscarriage at 6 months. Last menses May 25, 1927 (8.5 months).

Complains of edema of feet, dyspnea, cough, bloody sputum, abdominal distention, headache, dizziness, epigastric pain, vomiting.

Blood pressure 190-130. Pulse 120. Respiration 34. Temperature 97.6. Albumin + + + +, edema of hands, feet and face, râles in both lungs, icterus, abdominal distention.

Treatment: Saline laxatives by mouth, digitalis, ammonium chloride, magnesium sulphate intravenously and intramuscularly.

After delivery saline laxatives, digitalis and magnesium sulphate intravenously were continued until the blood pressure decreased.

Last examination: Blood pressure normal. Albumin +. Some digestive disturbance the result of liver injury.

DISCUSSION

Dr. W. H. Condit (Minneapolis): We have just listened to a very interesting paper by Dr. Mills on the management of non-hospitalized patients suffering from convulsive toxemia of pregnancy. Dr. Mills is to be congratulated on his success in his treatment of these cases without the advantage of hospital facilities or intravenous medication.

I do not like the term "eclampsia" and try never to use it in my teaching. It is derived from a Greek root meaning "a shining forth," and I can see nothing bright or shining about the convulsions of toxemia. I prefer the term "convulsive toxemia."

The mystery surrounding the developing fetus, including the changes in the physiological chemistry of the mother, is still a closed book. It is because of the unknown etiology of convulsive toxemia that the subject is so fascinating. Considerable data on the subject have appeared during the last two years, but we still know little more than we did a hundred years ago. Let us not forget that every case is a law unto itself, and in the treatment of the individual case we have no hard and fast rules or methods which we can follow.

The most convincing of the recent investigations on the subject is that of Titus and his co-workers, who claim proof that (1) a disturbance in carbohydrate metabolism in convulsive toxemia actually exists; (2) contrary to general opinion, hyperglycemia is not characteristic of the convulsive type, but (3) convulsions are directly related to and probably the result of hypoglycemic levels. There is usually a temporary rise in blood sugar content following a convulsion, indicative of the customary physiological response of the liver to muscular activity. The blood sugar values begin to seek hypoglycemic levels following frenzied efforts to effect recovery, thus causing fluctuating waves or levels. Therapeutic measures based upon this theory have been successful, but laboratory proof of its correctness is lacking.

There is no doubt that the major therapeutic measure in handling the toxemias of pregnancy rests in prophylaxis. It was my pleasure to read a paper before the Cook County Medical Society in Chicago eleven years ago, when we were first advancing and encouraging the study of hypertension in pregnancy as a very valuable prophylactic measure. The value of this particular study has been greatly magnified in later investigations. The only other therapy of value after the toxemia has advanced to the convulsive stage is absolute isolation and complete muscular rest, with non-irritating eliminating measures.

Dr. Mills spoke of hot packs stimulating convulsions. This is no doubt due to the mechanical irritation in the mere application of the pack, causing the value of the skin elimination to be more than counteracted by the irritation of the application. The patient should have complete muscular rest, isolation, only hypodermic administration of morphine, chloral by bowel, and magnesium sulphate, if used, by hypodermic or intravenous administration. Intravenous injections of strong hypertonic glucose solution (50 to 75 gm. in 200 to 300 c.c. of distilled water, 25 per cent solution) are given over a period of not less than an hour and may be repeated after intervals of four or five hours. Dorsett reports thirty-eight cases in which as high as 100 c.c. of the 25 per cent solution of magnesium sulphate were given over a period of twenty hours.

Contrary to the general impression that hyperemesis and toxemias of pregnancy are accompanied by hyperacidity, the majority of cases are really achylic or hypochlorohydric. I have had some startling and pleasing results in the relief of early toxemias, especially those accompanied by hyperemesis, through the administration of 5 to 10 mm. of dilute hydrochloric acid, three times a day.

The immediate emptying of the uterus does not always relieve the patient of her convulsions, nor does it greatly increase the chances of recovery. Accouchement forcé is a treatment of the past. Delivery should be made with as little muscular or nervous irritation as possible.

Dr. Gordon, of Brooklyn, reports one hundred cases of historotomy, with 27 per cent mortality. In our experience, a very few of these extreme cases are fit subjects for historotomy. We recently had a patient in the University Hospital who had delivered eighteen miles from the hospital, the delivery accompanied and followed by convulsions, who died a few minutes after entering the hospital. The postmortem revealed a liver which was completely destroyed by multiple hemorrhages and the patient's condition was the same as though she had had an amputation of the liver. Glycogen deficiency in the liver sooner or later becomes equivalent to a partial or even total extirpation. It would seem that the therapy of the future must hinge solely upon the study of the liver metabolism.

Since convulsive toxemia occurs only in pregnant women, interference with pregnancy prior to convulsions is the main therapeutic agent at our command, but not the easiest to carry out. Until somebody demonstrates the cause of toxemia and the definite therapeutic means of removing this cause, a problem which is surely a laboratory one, we should adhere to the sound clinical principle of treating every case as a law unto itself, and not be led astray by the report of a small series of clinical results with the use of any single therapeutic agent.

MALTA FEVER: REPORT OF CASE

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Minneapolis

Synonyms:

Undulant Fever
Mediterranean Fever
Gibraltar or Rock Fever
Goat Fever
Bruce's Septicemia
Melitensis Septicemia, etc.

MALTA fever has existed along the shores of the Mediterranean for centuries. Attention was directed towards many cases occurring in Malta; hence the name Malta fever. The relation of the disease in man to a certain disease in goats had been recognized for a long time. Bruce, in 1887, discovered the causative organism, which was thereafter named *Brucella Melitensis.* More recent laboratory studies, by Evans and others, have shown that *Micrococcus Melitensis,* the organism causing the disease in goats, and *Bacillus Abortus,* the organism responsible for contagious abortion in cattle, are closely related varieties of the same species of bacteria; hence the designation, *Brucella Melitensis,* variety *Abortus,* and *Brucella Melitensis,* variety *Melitensis.* In man the two varieties apparently produce the same clinical course of the disease.

In an article, read before the laboratory section of the American Public Health Association, October 16, 1928, Evans states that in the sixty-five cases, in which the age was given, the incidence of the disease was greatest in young adults, between thirty and forty years of age. Six of the sixty-five cases were in children under fifteen years of age; the youngest being four years old. Evans has also shown that the incidence is greater among males than females. Only twenty-seven out of a total of 117 cases, or 23 per cent, were in females. Her observation agrees with Kern, who compiled the figures for twenty-two cases.

Craig, in 1903, reported the first case of Malta fever contracted in the United States. However, Keefer probably described the first proven case in this country, in 1924, a case traceable to cattle. Since his report, sporadic cases have been reported from the following localities in this country: New York, seven; Iowa, five; Michigan and Utah, three each; Maryland, two; California, Connecticut, South Dakota, Virginia, and the District of Columbia, one each.

The possible sources of infection are: (1) Raw cow's milk and goat's milk; (2) eating infected meat from cows and hogs; (3) handling infected meat, for example, in packing houses; (4) contact with cattle having contagious abortion.

The period of incubation varies from ten to fourteen days in man. As to symptomatology, Craig says, "There are no pathognomonic symptoms of Malta fever. The symptoms observed are so inconstant and confusing that no one of them can be said to be typical of the disease. A differential diagnosis is almost impossible in the majority of cases, without the aid of the microscope, and the blood agglutination tests."

However, the average case, according to the recent literature, is characterized by malaise, chills, fever, sweats, and neuritic or vague abdominal pains. In typical cases we have arthritis, with painful swollen joints without redness, severe headache, vomiting, and constipation or diarrhea. There are ambulatory cases that manifest no symptoms, other than malaise, and probably a slight rise of temperature towards evening.

Blood examination shows a marked secondary anemia, normal leukocyte count, or leukopenia, with a relative increase in lymphocytes. Awe and Palmer report a mononucleosis. The spleen and liver are usually somewhat enlarged, but may be normal. The average duration of illness is from three to twelve weeks, but may continue for longer periods, relapses being the most discouraging feature. The most common complication is orchitis, which is rather infrequent. Less common are pneumonia and cardiac failure.

Other diseases usually considered in the differential diagnosis, are: typhoid fever, malaria, tuberculosis, influenza, endocarditis and rheumatism.

The prognosis for the attack is good, the mortality being between 2 and 3 per cent.

The treatment is entirely symptomatic. Mer-

curochrome and acriflavine have been used intravenously. Vaccines have been tried, with results too indefinite to justify their use. Awe and Palmer report good results from intramuscular milk injections. The measures for the prevention of the disease in man are (1) pasteurization of all milk, the organism being killed at 142 degrees Fahrenheit for thirty minutes; (2) adequate measures for the control of the disease in cattle.

REPORT OF CASE

C. S., a man aged 31, a collector for a collecting agency, was admitted to the hospital November 5, 1928.

He complained of severe chills with fever, followed by profuse sweating, indefinite abdominal pain, weakness, loss of weight, poor appetite, and constipation. These symptoms, beginning about Oct. 1, 1928, developed gradually, at first only chilly sensations being present. At night he would awaken with a headache and indefinite abdominal distress. He was up and around for about a week, when he was forced to remain in bed, because of severe chills, fever, sweats, weakness, and abdominal pain.

When first seen at his home, Nov. 5, 1928, he was having a severe chill, generalized abdominal pains, flushed face, temperature 104, and pulse 90. He had lost fifteen pounds in weight since the onset of symptoms; there was generalized abdominal tenderness, most marked over McBurney's point and the right hypochondrium. He had had the usual childhood diseases, influenza in 1918 and in 1927. He never had had an attack of chills, fever, sweats, etc., simulating the above symptoms. He had had no operations nor injuries.

On admission to the hospital, his temperature was 104, pulse 96, respiration 24. There were no additional abnormal physical findings, except that the tenderness over McBurney's point was much less pronounced, there being quite generalized tenderness over the entire abdomen. The spleen was not felt. Blood pressure was 118 systolic, 65 diastolic. The blood picture showed a leukocyte count of 4,100, P. M. N.'s 64 per cent, lymphocytes 34, myelocytes 2. Red count, 3,950,000. Hemoglobin 66 per cent. Further blood studies on three later dates showed a constant leukopenia, the white cells never going above 5,000, the P. M. N.'s averaging 60 per cent, lymphocytes 37, myelocytes 3. The blood Wassermann was negative. Blood studies for typhoid, paratyphoid A and B, malaria, and a blood culture proved negative. The urine was normal on six consecutive daily specimens. Cystoscopy and pyelograms showed normal kidneys, ureters, and bladder. *X*-ray of the chest was negative. *X*-ray of the gallbladder showed it fairly well filled, normal in size and shape, emptying nearly completely. No calculi were demonstrated. Gastro-intestinal *x*-ray was normal, except for two probably small diverticuli of the sigmoid. After colon flush and *x*-ray, the barium was not present at these two small areas. The appendix was well visualized. *X*-ray of the spleen showed it to be probably slightly larger than normal. *X*-ray of the sinuses and teeth were negative.

On November 17, 1928, agglutination tests were made for Tularemia and Malta fever at the Minnesota State Board of Health. The agglutination test for Tularemia was returned negative, whereas the agglutination test for Malta fever was positive, being complete in dilution of 1 : 640, and partial in 1: 1280. On Nov. 23, 1928, another agglutination test was positive for Malta fever, being complete in dilution of 1: 920. On Dec. 1, 1928, a third agglutination test was returned positive for Malta fever, being complete in dilution of 1 : 960.

During the patient's residence at the hospital, the pulse was never above 100, usually between 80 and 90. Respiration was never above 24. The temperature was wave-like (undulant) in character, the patient experiencing on an average of one chill, with sharp rise of temperature, in each twenty-four hours. The highest temperature was 105, the average temperature being about 102, with each chill. The temperature would drop to about normal as abruptly as it would rise. Between the periods of pyrexia, his general appearance was that of a well patient, ready to leave the hospital. He would feel very well, except for soreness throughout the abdomen, which, on daily examination, presented inconstant findings. He had occasional epistaxis. The temperature fell by lysis. The temperature having been normal for three days, and the symptoms having abated, he left the hospital Nov. 30, 1928.

As to the possibility of the source of infection in this case, he gives a history of eating at various restaurants, not having a permanent boarding place. Raw cow's milk must be considered. He eats considerable pork, it being his favorite meat. Many times it was not properly prepared, and was very rare. Also, last September, while in Montana, he spent considerable time around the stockyards.

On December 6, 1928, the patient came to the office. He had gained ten pounds in weight. Hemoglobin was 83 per cent. He had no complaints, other than some weakness, which he was gradually overcoming.

Reports of cases, gathered from the literature, with the probable source of infection, in some instances, are given in Table I.

From the Public Health report in New York State, April 6, 1928, we have the following: From January 1, 1926, to April 6, 1928, twenty-four cases have come to their attention. One was acquired in the State Laboratory; the others were traced to drinking of raw cow's milk, it being demonstrated that the cows were infected with contagious abortion.

From the proceedings of the Staff Meetings of the Mayo Clinic, Rochester, Minn., June 29, 1927, Habein gives an analysis of four cases on record at the Mayo Clinic. In each case there

TABLE I

Author	References	Cases	Source of Infection
Carpenter, C. M., and Merriam, H. E.:	Jour. Am. Med. Assn. Oct. 16, 1926	2	Raw cow's milk
Duffie, Don H.:	Jour. Am. Med. Assn. Nov. 27, 1926	2	Not demonstrated
Gage, E. E., and Gregory, D. A.:	Jour. Am. Med. Assn. Sept. 11, 1926	1	Killing hogs
Acken, Henry S.:	Jour. Am. Med. Assn. May 29, 1926	1	Not demonstrated
Hull, T. G., and Black, L. A.:	Jour. Am. Med. Assn. Feb. 12, 1927.	4	Raw cow's milk (2) Not demonstrated (2)
Tod, M. L.	The Military Surgeon July, 1927	2	Not demonstrated
Fisher, M. E., and Garen, J. P.:	New York State Jour. of Med., July 1, 1927	1	Cattle
Williams, J. P., and Shaw, F. W.:	South. Med. and Surg. June, 1928	2	Not demonstrated
Warner, W. P.:	Pub. Health Jour. July, 1928	1	Not demonstrated
Awe, C. D., and Palmer, H. D.:	Am. Jour. Med. Sci. December, 1928	5	Bovine (3) Porcine (1) Not demonstrated (1)

was a history of ingestion of large quantities of raw cow's milk, and in one, contagious abortion had occurred in the herd from which the milk came.

CONCLUSION

Malta fever is no longer a disease restricted to the countries bordering the Mediterranean. There have been sufficient number of cases reported since 1924, showing that it is endemic throughout the United States, and that it is probably more prevalent than heretofore supposed. In all cases of long protracted fever, where it is difficult to establish a diagnosis, the existence of Malta fever should be suspected, and blood studies made for the specific agglutination test.

ADDISON'S DISEASE: WITH A REPORT OF TWO CASES

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Glen Lake Sanatorium
Oak Terrace, Minnesota

ADDISON'S disease is a morbid condition characterized by muscular and circulatory asthenia, gastro-intestinal disturbances and a peculiar pigmentation of the skin and mucous membranes. This disease was originally described by Thomas Addison in 1849,[1] and in 1855,[2] as a severe anemia. Addison described a clinical and not a pathologic entity, and the underlying pathology in true Addison's disease may show great variation, as we shall see.

The case which prompted this report was of singular interest to me and should prove so to those interested in tuberculosis and its treatment with heliotherapy. The second case being reported was a typical Addisonian syndrome and came under my observation while I was preparing to report the first case.

The condition is quite rare, as can be judged from the Mayo Clinic report by L. C. Rowntree,[3] who states that only about 70 cases have been observed there in their many thousands of admissions. It is definitely more common in males, and in the third to sixth decades of life.

My first case is as follows:

E. L., a male aged 53, an employee and ex-patient at Glen Lake, reported for sick call on June 3, 1927, with the following complaints: (1) Nausea and vomiting; (2) loss of appetite; (3) extreme weakness.

About two weeks prior to this time he felt slightly nauseated after meals. There was no abdomial pain but a sense of discomfort in the epigastrium. He took a cathartic, after which he had a copious bowel movement and was practically free from symptoms for about a week; then nausea, vomiting, general malaise and pronounced weakness returned.

Past history revealed that he had been admitted to Glen Lake Sanatorium with pulmonary tuberculosis in 1919. This responded well to treatment but when the patient started exercise he developed a cervical Pott's disease in 1921. From the spring of 1921 until the onset of the present illness he had taken daily heliotherapy and had a beautiful tanning of the skin. He was discharged in the fall of 1925 with a healed tuberculous spondylitis and an arrested pulmonary lesion. There had been no symptoms and no complaints until the onset of the present illness.

Family history was negative.

Physical Examination: Head—eyes, ears, nose and throat negative, teeth and tonsils removed. Neck—some stiffness as result of healed Pott's disease. Chest—heart, negative; lungs, harsh breathing and a few râles in apices after coughing. Abdomen—soft and slightly doughy; some tenderness in epigastrium; no other tenderness, masses, rigidity, or muscle spasm. Bilateral inguinal hernia with herniotomy scar on left. Extremities—muscle tone fair, considerable weakness. Skin—dry and rough, and uniformly pigmented. This pigmentation was considered the result of six years of heliotherapy.

A diagnosis of peptic ulcer was made and the patient was put to bed. On June 7th, a barium study of the stomach was made which revealed nothing abnormal and he was put on a bland diet. Patient felt well for several days but had a recurrence of symptoms on June 10th. Tr. Belladonna Mviii t.i.d. was ordered for three days. On June 13th he still had no relief. He was unable to retain even water. Abdomen was doughy. No fluid was demonstrated in the abdomen, no masses or tenderness and no jaundice. Findings suggested at that time some type of peritoneal irritation. Patient was given glucose and soda by rectum, and hypodermoclysis of normal saline solution daily for next five days with nothing by mouth.

June 17, the gastro-intestinal consultant advised Sippy management. The patient progressed favorably on the Sippy régime, the nausea and vomiting ceased, and his strength returned to some extent. The skin remained dry and rough and the abdomen doughy. Tuberculous peritonitis was suspected.

On June 22 a barium *x*-ray study of the stomach was made with the gastro-intestinal consultant. Diagnosis: Reflex pylorospasm. Patient was continued on Sippy regime and retention enemata of glucose until July 1, 1927; then he was put on a general diet. All symptoms subsided and patient began to feel well. Graduated exercise was rapidly increased without recurrence of symptoms. Temperature varied between 97.2 and 98.8 degrees (R) until Jan. 17, 1928.

On January 17, the patient had emesis of breakfast and emesis every hour during the following night. On the next day the pulse was weak and thready, the skin very dry and brown. Hypodermoclysis was given daily, with glucose per rectum until January 23, when soft diet was again given. Gastro-intestinal study on April 6, 1928, revealed gastric ulcer. Stools showed occult blood. On April 23, he was seen by the surgical consultant, who advised forced feeding and then exploration. The case was considered by all as peptic ulcer.

Patient had been without heliotherapy from June, 1927, to April, 1928, but was still well tanned (pigmented). He began sun cure again on April 23, and continued until June 7.

On June 7 patient awoke vomiting, and felt very weak and miserable. He vomited all day in spite of medication. Intravenous glucose was given on the morning of June 8, and a blood count made. This was: R. B. C. 350,000, W. B. C. 22,000, Hgb. 85 per cent; Differential—P. M. N.'s 89, Lymphos. 7, Monos, 4. Temperature 103° (M).

Vomiting persisted throughout the day, the patient became pulseless and very dehydrated in the afternoon and died early the following morning.

Autopsy Findings: Inactive tuberculosis of lungs; gastric ulcer—old; tuberculosis of adrenal (Fig. 1); tuberculosis of prostate; tuberculous abscess of kidney.

The diagnosis here was missed because of: (1) Simulation of complaints to those accompanying gastric ulcer; (2) failure to record blood pressure (again because of simulation to gastric ulcer); (3) obscuring of characteristic pigmentation by tanning due to sun baths.

The next case is clinically and pathological an Addison's disease due to tuberculosis of the adrenal glands.

J. K., a white male, aged 29, was admitted to Glen Lake Sanatorium, Aug. 11, 1928, with the following complaints: (1) Nausea and vomiting; (2) pains in left chest along the rib margin and in the right shoulder.

Illness dated back to January, 1928, when he began to feel weak. He lost his pep after a gastro-intestinal upset which was diagnosed as "stomach flu." Nausea and vomiting recurred; after this a feeling of weakness became manifest. Symptoms did not change much until March, 1928, when they became worse and in addition patient noticed that he was very dizzy when he assumed the erect posture after stooping over. About this same time he noticed that the skin of his face, forearms and abdomen was becoming darker than the rest of his skin.

Past history revealed the removal of a tuberculous epididymis in 1921; operation for gangrenous appendix in 1924; and an attack of bronchitis in 1923, which lasted ten days.

Physical examination revealed the following: A white male, 29 years of age, lying quietly in bed. Height 5 feet 8 inches; weight 124 pounds. There was a rather pronounced dark brown pigmentation of the face and neck, forearms, abdomen, and the skin over the lumbar spine and buttocks (Figs. 2 and 3). The skin was soft and smooth, muscle tone was not good but the flesh felt firm. No adenopathy noted. The eyes were prominent and the lid slit was wider than normal. There were pigmented spots just inside the corners of the mouth. The thyroid was palpable but not materially enlarged. There was a large scar to the right of the umbilicus (the result of a foot ball injury), a scar over McBurney's point, and one over the left groin. These scars were all deeply pigmented, as were the nipples. The genitalia were somewhat darker than the surrounding skin. The left testicle was absent. A scar over the right knee 1.5 x 0.5 cm. was not pigmented. Murphy percussion over left kidney caused excruciating pain.

Pulse rate 110. Blood pressure 70/48. Respiration 16.

Examination of the chest revealed only a slight amount of impaired resonance over the apices; breath sounds and voice sounds were normal; no râles heard. *X*-ray of chest revealed thickened pleura over base of left lung, with calcified and fibrotic tuberculosis involving the left lung as far as the third rib with a few small areas below this. Calcified and fibroid tuberculosis involving the extreme apex of the right lung, with slight thickening of the pleura about it.

Fig. 1. Sections of adrenal glands, Case 1, showing numerous tubercles (T) and a large caseous process (C.T.).

Laboratory Findings: Sputum—negative for tubercle bacilli. Urine—sp. gr. 1011; faint trace of albumen; no sugar; occasional granular and many hyaline casts per h. p. f. Blood—Wassermann negative, R. B. C. 3,410,000, W. B. C. 8,800, Hgb. 65%, Lymphos. 27, L. Monos. 6, Eos. 2; Widal—negative.

Diagnosis of Addison's disease was made and a fatal prognosis given. The patient was started on a Muirhead régime, which was continued until the day of his death. Adrenalin Mv by hypodermic caused a slight chill and discomfort so the dose was cut to Miii. This was supported by dried gland gr. iv by mouth t.i.d. and adrenalin Mxv by rectum once a day. The diet consisted of fruit juices, milk and cream and soft tasty foods of high caloric value. This régime was carried out from August 11 to August 28 with apparently good results. The nausea and vomiting subsided to some extent and the blood pressure hovered between 74 and 78 systolic. The fluid intake just about doubled the urinary output, but there was much fluid loss through emesis.

On August 29 ephedrin was given in place of the adrenalin as suggested by Chen and Schmidt[35]. One

dose of 200 mgm. was given by mouth at 10:00 a. m. and at noon the blood pressure was 84. The patient complained of slight feeling of dizziness but no other symptoms. The blood pressure remained up between 84 and 90 systolic until 9:00 p. m.; the next morning it was 68/56. On the following day the Muirhead régime was again started. This was supported by rectal and subcutaneous administration of fluids. From September 1st until the 11th the patient's condition became progressively worse and he died on September 11, 1928, apparently in uremic coma. During the last forty-eight hours patient exhibited Biot type of respiration.

Blood Chemistry: Aug. 30—non-protein nitrogen 51, urea-nitrogen 25. Sept. 4—non-protein nitrogen 71, urea nitrogen 35. Sept. 9—non-protein 120, urea nitrogen 61.

The urine showed albumin, hyaline and granular casts at every examination. Systolic blood pressure hovered between 66 and 44 and the morning of his death the systolic pressure was 30, with absolutely no response to adrenalin.

During practically all of the last ten days of life the patient did not respond at all to adrenal therapy. Blood transfusion was considered as was gland transplant, but neither were attempted because of the shock which the patient experienced from even hypodermic injections.

Post-mortem examination revealed: tuberculosis of both lungs; tuberculosis of both adrenals (figure 4); tubercles in prostate; tubercles in left seminal vesicle; tubercles of lymph gland at head of pancreas; adenoma of thyroid; atrophy of right testicle.

Fig. 2. Anterior view of body, Case 2, showing pigmented areas.

Fig. 3. Posterior view of body, Case 2, showing pigmentation over buttocks and lumbar region.

Probably the first authentic record of what could be termed the Addisonian syndrome is the account of the illness of a young priest which was found by Mananon[4] in a work dated 1554-57. Nothing more appeared in the records, apparently, until Addison[1] entered his first discussion of the peculiar form of anemia in 1849. This was followed by a lengthy discourse on the syndrome in 1855.

About this same time, reports on physiological work began to appear. Claude Bernard[5] in 1848 reported some experimental work on the adrenal. Brown-Sequard,[6] 1856, noted that excision of the adrenals in animals produced a condition simulating an exaggerated Addison's disease. Oliver and Schafer[7] in 1894 found that an injection of an aqueous extract of adrenal glands slowed the heart and raised the blood pressure of animals.

The year 1896 marks the real beginning of knowledge of the adrenal, for in this year Abel[8] isolated the active principle of the gland. From that date on, adrenal extract has slowly made its way into medicine, and our knowledge of adrenalin has increased. On the other hand, our knowledge of the exact functions of the adrenal bodies has not kept pace with that relative to its active principle.

The symptoms and physical findings in Addison's disease are discussed at great length in Addison's original work.[1] These symptoms are found in the pure Addisonian case which goes on to exodus as well as in a case of a secondary suprarenal hypofunction which recovers under treatment.

I plan to report some observations on suprarenal hypo-function secondary to toxins, amyloidosis, etc., at a later date.

Muscular asthenia is one of the most striking points in the diagnosis. The history may reveal a progressive weakness and indisposition to exertion. This may or may not be accompanied by dyspnea, though this condition always develops at some time during the disease. Since the Addisonian syndrome frequently follows influenza, this increasing lassitude and apathy are often considered signs of slow convalescence. Accompanying the muscular asthenia is found evidence of circulatory weakness. Before the days of the sphygmomanometer, changes in circulatory pressure were detected by changes in the pulse. Thus Addison described the pulse: "Perhaps large, but remarkably soft and compressible." Today we find with our modern methods a marked lowering of the systolic and diastolic pressures. The pulse reveals that "remarkably soft and compressible" state; and there is evidence of disturbed cerebral circulation. Early in the case the patient will complain of being dizzy when he assumes the upright after being in a stooped or prone position. Later on in the disease, lowering of the head will often cause a comatose condition. The heart rate becomes rapid as the blood pressure drops, a provision of nature to maintain circulation.

Gastro-intestinal manifestations are probably the most varied of any of the symptoms. These may vary from nausea, which is moderate, to severe vomiting, diarrhea, and abdominal pains. Nausea and vomiting are probably the most common gastric symptoms. Diarrhea and constipation, alternating or one alone, are frequent, while anorexia is found in practically all cases. Addison says: "Slight pain or uneasiness (nausea) is from time to time referred to the region of the stomach, and there is occasionally actual vomiting, which in one instance was both urgent and distressing." Lockwood[36] reported gastro-intestinal manifestations in six cases of Addison's dis-

Fig 4. Photograph of adrenal glands, Case 2, showing tubercles. These glands were a solid mass of tubercle formation.

ease. All six showed some disturbance. There was achlorhydria in three, nausea and vomiting associated with dizziness in one, constipation in three, diarrhea in two, and a gastric ulcer was suspected in one case. Rowntree found some gastro-intestinal disturbance in all his cases, and says that nausea and vomiting in terminal stages often resist all attempts to control.

According to Rowntree,[3] the criteria for diagnosis of Addison's disease are: (1) low blood pressure, (2) muscular asthenia, and (3) pigmentation. Addison described the pigmentation as a " . . . most remarkable discoloration taking place in the skin . . . This discoloration pervades the whole surface of the body, but is commonly most strongly manifest on the face, neck, superior extremities, penis and scrotum, and in the flexures of the axilla and around the navel. It may be said to present a dingy or smoky appearance, or various tints or shades of deep amber

or chestnut color." Rowntree had devised a tintometer for the accurate gradation of the coloring in his patients. One of my cases (Case 1) presented a generalized bronzing of the skin which was attributed to his prolonged treatment with heliotherapy.

Pigmentation of the oral, vulvar and anal mucosa is described by some observers. I found pigmented spots in the oral mucosa in one of my cases, and also pigmentation of the retina as described by A. L. Brown.[9] The most frequent location is the lips, and oral and buccal mucosa. Rowntree and Ghrist,[10] White and James,[11] and Butznow[12] have, on the other hand, reported cases without pigmentation in any location. The case of Rowntree and Ghrist[10] is the only one occurring in the Mayo Clinic series of over seventy cases. Pigmentation likewise was absent in two of Coneybeare's[13] twenty-nine cases.

Early in the disease the urinary tract does not reveal evidence of injury or malfunction, but as the process goes on there is a decreased elimination of water and solids, with a piling up on the blood stream of the nitrogenous waste products. The anuria which develops is probably due to the diminished blood flow through the kidney, and to the lowered pressure under which it flows.

The pains described by Addison referable to the gastro-intestinal tract were noted in my cases, as well as in those of others. Rowntree reports, in his series, pains in the epigastrium, lumbar region and flanks, which may be vague, dull or deep aching pains in both arms and shoulders. These probably are adrenal in origin.

The dyspnea, collapse and syncope which develop in all cases are undoubtedly adrenal in origin. In the extreme stage, the patient goes into a state resembling shock due to the superposition of uremia on the already anemic vital centers, and usually dies in the state of coma. In this connection it is interesting to note the type of respiration which develops in the terminal stage of Addison's disease. Biot first described it, and it bears his name. Rowntree[3] has drawn attention to it, and I noticed it in one of my cases. This type of respiration is characterized by short and rapid breathing interrupted by pauses of ten to thirty seconds.

The blood in Addison's disease was thought by Addison[2] to show pronounced anemia. Averbeck[15] thought that there was an anemia accompanied by a reduced blood volume. Buhl[16] was of the opinion that there was a sharp decrease in the total number of red cells, while Newman[17] stated that the red counts and hemoglobin percentages were low. Osler[18] on the other hand says anemia is not an essential feature, and Brown and Roth[19] of the Mayo Clinic found anemia in six per cent of cases, and believe it to be the exception rather than the rule. From the standpoint of blood chemistry, we find in the nitrogenous elements just what we expect, namely, a marked increase. Non-protein nitrogen in one of my cases ran from 51 to 120 mgm. for 100 c.c., while the blood urea nitrogen ranged from 25 to 61 mgm. In sixteen cases Rowntree[3] reports a blood urea nitrogen of 30 or over in ten, 50 or over in four, and 90-100 in two. The blood sugar is reported by Rosenow and Jugutts[20] as fluctuating around normal. There are, however, relatively few blood sugar determinations reported. Chapman[21] in reporting one case of Addison's found the glucose tolerance curve to be quite flat, falling off very slowly, thus indicating a raised tolerance for glucose. There is probably no laboratory finding, then, characteristic of Addison's disease other than the adrenalemia.

C. L. Spohr and R. A. Moore[22] have recently reported an analysis of the pigment derived from the lymph glands in a case of Addison's disease. The pigment was found to be a true melanin and has the following composition: carbon 54.8, hydrogen 5.56, nitrogen 11.24, sulphur 3.10.

The underlying pathologic conditions in Addison's disease probably fall into two groups described by Bittorf,[23] which are: Group 1: includes those cases in which there is an essential or idiopathic adrenal insufficiency, and no infectious agents or tumor growths can be demonstrated. There exists in these cases an atrophy or sclerosis of the adrenal tissue.

Group 2: includes those cases of secondary adrenal insufficiency due to tuberculosis or tumor growth.

Thomas Addison reported, in 1855,[2] eleven cases of the clinical syndrome now bearing his name, and his post-mortem reports reveal: Tuberculosis of the adrenals in seven cases, carcinomatous invasion in two, and simple atrophy in one. Bittorf[23] collected from the literature forty-seven cases showing atrophy or sclerosis, and reported five cases of his own, three of which showed primary insufficiency. Medlar,[24] in a review of the medical literature of the United

TABLE I

CLASSIFICATION OF CASES REPORTED

	Cases	Group 1	Group 2	
Addison[2]	11	1	7 Tbc.	3 Ca.
Harbitz[27]	22	2	20 "	
White and James[11]	1		1 "	
Rowntree and Ghrist[10]	1		1 "	
Coneybeare[13]	29	7	22 "	
Medlar[24]	2	2		
Warthin[25]	3	3		
Hedinger[28]	15	1	14 "	
*Bittorf[23]	5	3	2 "	
Butzow[12]	1		1 "	
**Wakefield and Smith[29]	3	1	1 "	1 toxic
Wiesel[26]	1		1 "	
***Rowntree[3]	9	1	8 "	
Higgins[30]	1		1 "	
Philpott[31]	14	1	7 "	4 Ca.; 1 myc. fung., 1 amyloid.
Feinblatt[32]	1		1 "	
Petter	2		2 "	
	121	22	89 Tbc.	7 Ca.; 1 toxic, 1 myc. fung., and 1 amyloid.

*Bittorf also reports 47 cases which he collected to show atrophy.
**One case here was a toxic adrenalopathy which recovered.
***Rowntree reports on 48 cases but has pathologic evidence on 9 only.

States, says all cases of Addison's disease reported with necropsy findings fall into the second group. The two cases of his own fall into Group 1. It is interesting to note here that several observers, namely, Medlar,[24] Warthin,[25] Bittorf,[23] and Wiesel[26] report a hyperplasia of thymus, tonsils, spleen, lymph nodes, and Peyer's patches in association with destructive lesions of the adrenals. Wiesel[26] reports one case in which there was tuberculosis of the adrenals, but no symptoms of Addison's disease. Further investigation in this case revealed an excess of chromaffin tissue outside the adrenals. He also reports a case of Addisonian syndrome with no lesion of the adrenals, but showing an absence of accessory chromaffin tissue.

It is generally conceded then that in addition to the lesion in the adrenal there is a congenital inferiority of the chromaffin system as a whole.

I have been able to find 121 cases of Addison's disease reported showing pathologic evidence of atrophy in 22, tuberculosis in 89, carcinoma in 7, mycosis fungoides in 1 and amyloidosis in 1. There are 39 additional cases reported by Rowntree without necropsy or operative report. Bittorf has reported 47 cases which he collected to show atrophy. This would bring the total number of cases I have found in the literature to 208.

The prognosis of a true Addisonian syndrome is uniformly fatal, although there may be a period of weeks or months between the first and final attacks. This is well brought out in my first case.

Treatment of Addison's disease is probably as unsatisfactory as anything could be. The accepted form of therapy today is that outlined by A. L. Muirhead,[33] a professor of pharmacology and himself a victim of the malady. While able to record his observations and direct his own treatment, Dr. Muirhead relieved his symptoms with 0.5 to 1.0 c.c. of 1 : 10,000 adrenalin hydrochloride by hypodermic, b.i.d. with 2 c.c. of 1 : 1,000 adrenalin hydrochloride in physiologic saline, by rectum b.i.d. Slowly his disease progressed to the point where he was unable to administer to himself and Dr. L. G. Rowntree[34] reports the following changes and additions to the Muirhead regimen:

Adrenalin hydrochloride 1 : 1000 ..... Miii (h) b. i. d
Whole adrenal extract ..... 3/200 gr. (rectum) } at h. s.
Whole gland extract ..... 20 gr. (mouth) }

This régime held the symptoms and progress of the disease in abatement for a time but could not stave off the final outcome.

In attempting to use this form of treatment one must first determine the patient's tolerance to adrenalin. It is interesting to note that these

people usually have a hypersensitiveness to adrenalin because of the gradually diminishing secretion from their own glands. Therefore, one must start with small doses and gradually build them up to point of tolerance. The symptoms of overdose are: dizziness, abdominal pain, increase in nausea, and, when given by rectum, tenesmus.

Wakefield,[29] in a very comprehensive article, says "little can be done in the way of treatment. Rowntree claimed results after using Muirhead régime. Ephedrin has been used but is inferior to the Muirhead régime. Many have been disappointed after suprarenal transplants."

I feel that suprarenal transplant is the hope of the future, if done early and small grafts used at intervals rather than one large transplant which will overload the body with adrenalin as well as foreign protein.

In conclusion:

1. Addison's disease is a clinical entity due to a pathologic change in the adrenal glands or accessory chromaffin tissues, or both, due to an invasion of these tissues by an infective or infiltrating process or an atrophic and sclerosing metamorphosis. 2. The disease may subside and then recur but is probably 100 per cent fatal.

3. The treatment to date seems to be the Muirhead régime, though gland transplant may be the salvation of the future.

4. Toxic adrenalopathies following acute infectious diseases, arsphenamine injections, starvation, fatigue and excessive nervous shock, show symptoms of Addison's disease but recover and probably are the cases which have been reported as Addison's disease with recovery.

BIBLIOGRAPHY

1. Addison, Thomas: Anemia: Disease of the suprarenal capsules, London Med. Gaz. 1849, 43, 517.
2. Addison, Thomas: On the constitutional and local effects of disease of the suprarenal capsules. S. Highly, London, 1855, 43, 11 pl. fol.
3. Rowntree, L. G.: Studies in Addison's disease, Jour. Am. Med. Assn., 1925, 84, 327.
4. Maranon, G.: El caso mas antiguo conocido de enfermedd de Addison, Siglo med. 1922, 70, 605.
5. Bernard, C.: De l'origine du sucre dans l'economie animal, Rignoux, Paris, 1848, 99 pp., 8.
6. Brown Sequard: J. Physiol., 1858, 1, 160.
7. Oliver and Schafer: The physiological effects of extracts of the suprarenal capsules, Jour. Physiol., 1895-1896, 18, 230.
8. Abel, J. J.: On the blood-pressure-raising constituent of the suprarenal capsules, Johns Hopkins Hosp. Bull., 1897, 8, 151.
9. Brown, A. L.: Ocular findings in Addison's disease, Am. Jour. Ophthalmol., 1926, 9, 409.
10. Ghrist, D. G., and Rowntree, L. G.: Addison's disease without pigmentation, Case report, Endocrinology, 11:589-592, Nov.-Dec., 1927.
11. White, E. C., and James, W. F.: Addison's disease without usual pigmentation of skin: Report of Case: U. S. Nav. Med. Bull. 25:122-125, Jan., 1927.
12. Butzow, A. M.: Report of case of Addison's disease, Ill. Med. Jour., 51:471-473, June, 1927.
13. Coneybeare, J. J.: Guy's Hospital report on Addison's disease, 74:369, 1924.
14. Biot, C.: Contribution a l'etude du phenomene respiratoire de Cheyne-Stokes, Lyon Med. 23:517-561, 1876.
15. Averbeck, H.: Die Addison'sche Krankheit, Erlangen, 1869.
16. Buhl, L.: Wien. med. Wchnschr., 1860, 10, 4.
17. Neumann, H.: Heilung eines Falles von Addison-'scher Krankheit: Bemerkung uber regenerative Hyperplasie der rothen Blutkorperchen, Deutsch. med. Wchnschr., 1894, 20, 105.
18. Osler, W., and McCrae, T.: Principles and Practice of Medicine, 10 ed., Appleton, 1925, p. 882.
19. Brown, G. E., and Roth, H. M.: Volume and composition of the blood in Addison's disease. Am. Jour. Med. Sci., 1925, 170, 169.
20. Rosenow and Jugutts: Der Blutzucker bei Addison'scher Krankheit und sein Beeinflussung durch Adrenalin, Klin. Wchnschr., 1922, 1, 358.
21. Chapman, E. F.: Blood sugar in a case of Addison's disease, Brit. Med. Jour., 1926, 1, 323.
22. Spohr, C. L., and Moore, R. A.: Study of pigment in Addison's disease. Jour. Lab. & Clin. Med., 12:438-441, Feb., 1927.
23. Bittorf, A.: Addison's disease of suprarenal, Munchen Med. Wchnschr., 73:1928-1929, Nov. 12, 1926.
24. Medlar, E. M.: Essential adrenal insufficiency in Addison's disease, report of two cases, Am. Jour. Path., 3:135-142, Mar., 1927.
25. Warthin, A. S.: The pathology of thymic hyperplasia and the status lymphaticus in Addison's disease. Arch. Ped., 1909, 26, 597.
26. Wiesel, J.: Zm. Pathologic des Chromaffinen Systemes in Addison's Disease. Virch. Arch. Path. Anat. u. Physiol., 1904, 176, 103.
27. Harbitz, F.: The suprarenals in Addison's disease. Norsk. Mag. f. Laegevidenskaben, 87:371, May, 1926. Ab.: J. A. M. A., 87:290.
28. Hedinger, E.: Ueber die Kambination von Morbus Adisonii mit Status Lymphaticus, Frankfurt Ztschr. f. Path., 1907, 1, 527.
29. Wakefield, E. G., and Smith, E. E.: Addison's disease, suprarenalopathies, sclerosis of glands of

internal secretion, clin. reports and review of literature, necropsy findings and illustrations. Am. Jour. Med. Sci., 174:343-357, Sept., 1927.
30. Higgins, W. H.: A case of Addison's disease with unusual autopsy observations, Jour. Am. Med. Assn. 91:86, July 14, 1928.
31. Philpott, N. W.: Association with amyloidosis in Addison's disease. Ann. Int. Med. 1:613-620, Feb., 1928.
32. Feinblatt, H. M.: Addison's disease following vertebral tuberculosis. Med. Clin. No. Am. 11:1075-1077, Jan., 1928.
33. Muirhead, A. L.: An autograph history of a case of Addison's disease. Jour. Am. Med. Assn., 76:652, March 5, 1921.
34. Rowntree, L. G.: Subsequent course of a case of Addison's disease. Jour. Am. Med. Assn., 79:556, Aug. 12, 1922.
35. Schmidt, C. F., and Chen., K. K.: The action and clinical use of ephedrin in Addison's disease, Jour. Am. Med. Assn., 87:11, 837.
36. Lockwood, B. C.: The digestive tract and endocrine function in Addison's disease. Jour. Am. Med. Assn., 85:14, 1035.

TYPES AND TREATMENT OF CHRONIC ARTHRITIS*

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AT all times and in all ages chronic arthritis has been a significant factor in the health of the people, and it has taken its toll in life, suffering and disability with painful regularity. It is only in recent years that medical science has turned its attention to such a commonplace disease, and at present there are signs that the medical profession, and in certain instances the governments, are definitely interesting themselves in studying this menace in an effort to lessen its frequency and to relieve those afflicted with it.

England has done more than any other country to consider rheumatic diseases in their various relationships to the industrial worker. Rheumatic diseases come third on the list of those conditions which cause industrial workers to consult physicians in the British Isles; bronchitis comes first, and diseases of the digestive system second. There are 15,000,000 people in the insured group of the industrial panels in England, and practically all wage earners between the ages of sixteen and sixty-five are included in this number. Sir Walter Kinnear, in 1927, found that approximately one-sixth of the total period for which sickness and disablement benefit was paid to men was due to rheumatic diseases. The corresponding figure for women was one-seventh. It was estimated that about $20,000,000 was paid out of the general fund for rheumatic diseases, and if the loss in wages were taken into consideration, the sum would amount to about $85,000,000 loss for one year (1927). These figures show what a burden these diseases throw on the state, and on the patients and their families. In May, 1928, at Bath, England, a conference on rheumatic diseases was held. It was pointed out that facilities were needed to afford treatment for the masses of the people, and that these facilities must include means to provide for: (1) The discovery and elimination of foci of infection; (2) the supervision and control of the administration of drugs; and (3) the use of various methods and physical agents.

Last year, in the United States, a committee was formed for the study of chronic arthritis; the committee hoped to create an interest on the part not only of the medical profession but of the industrial world, insurance companies, and so forth; so that they would take more cognizance of the disease, aid in the efforts to render its occurrence less frequent, and provide means whereby the large number of sufferers from this disease might receive the benefits of modern medicine in its broader sense. In the past, these sufferers have received little or no attention in our larger hospitals and institutions, and consequently have drifted to the irregular practitioners and cultists. Our hospitals have been filled with patients with other diseases of a more acute type, and an organized effort has not been made to take care of these patients, to make a diagnosis based on a carefully conducted general examination, or to provide facilities for treatment, and especially instructions as to how to live with the disease to the best advantage. Lord Dawson made the remark: "We must think not only of the many days of sickness and the heavy loss of life, but we must also consider how chronic arthritis affects the quality of life."

Last year at The Mayo Clinic about one of every fourteen patients had one of the rheumatic diseases which constituted a primary or secondary diagnosis: a total of more than 5,000. The rheumatic diseases in their broadest conception include at one end of the clinical scale acute rheumatic fever and at the other end the various forms of chronic osteo-arthritis. Between these two extremes lie the many different forms of periarthritis, myositis, fibrositis, neuritis, and so forth. It is generally taught that the various members of the rheumatic diseases are streptococcal in origin, and some believe that there may be a chain of gradual transition from one group to the other, their main differences depending on variation in the organism, and inborn or acquired differences in the host. In spite of

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possible bacteriologic relationships, however, certain clinical entities separate themselves, and it is important to distinguish between the acute forms which do not leave permanent injury to the joint but injure the heart (for example, rheumatic fever), and those chronic forms, which usually spare the heart but produce marked residual joint deformity. Rheumatic diseases exhibit great diversity in their response to the different forms of treatment.

Although this discussion will consider the chronic forms mainly, it should be remembered that chronic arthritis may result from acute arthritis, or it may begin insidiously, being chronic from its inception. Acute rheumatic fever (inflammatory rheumatism, acute articular rheumatism) rarely if ever produces chronic infectious arthritis, even after repeated attacks. It is characterized by its acute, migratory, polyarticular nature, its response to salicylates, its proclivity to cardiac involvement, and the fairly rapid cessation of the arthritis after about two or three weeks. Fortunately, acute rheumatic fever is not so common as it was formerly, either in England or in this country.

Another type of acute arthritis may, however, lead to chronic disease of the joints; it may be either the specific infectious type of known bacteriology, or the so-called acute nonspecific infectious arthritis. Chronic infectious arthritis, however, generally comes on insidiously, affecting only one or two joints at first and gradually spreading to many, or even to all, the joints of the body. The disease usually runs an indefinitely prolonged course, but pain and disability vary in different persons. In some instances recovery may be quite remarkable, and one is often astonished at the good functional results that may ensue in spite of marked bony changes in the affected joints. Many of our patients who have been severely incapacitated for long periods, even bedridden, regain their health to an unusual degree, getting about adequately with only a residual stiffness or limp. On the other hand, the course is often a pitiful one. In some instances the disease may be prolonged for years, gradually crippling the patient and forcing him out of work. In others, it may progress rapidly to complete disability. In a few it may progress so malignantly that the patients, terribly crippled, finally succumb, their resistance lowered by the widespread and prolonged infection, death resulting not from the rheumatic disease but from some complication or intercurrent disease.

In general it would seem that there are two sharply differentiated types of chronic arthritis. One type, which is more common in females, may begin either in childhood, when it is known as Still's disease, or in early adult life, usually before the age of forty, then called rheumatoid arthritis or arthritis deformans. The joints become swollen, the roentgenograms show little if any bony destruction, and the patient may be completely disabled by the disease. Anemia and pallor, and often lymphatic enlargement, may develop.

The other group of chronic arthritis is that affecting older persons, and has been called "osteo-arthritis," "hypertrophic arthritis," and "destructive arthritis." The symptoms here are decidedly more chronic, the patient as the years advance having stiffness of the hip, stiff, painful, creaking knees, and so forth, often limping about, using a cane. The general health is fairly good, and the patients will often volunteer the information that if it were not for their joints they would be perfectly well.

These are the main clinical types of arthritis, but when one studies the group a little more closely, such a simple division into two groups is not satisfactory. A patient may actually have rheumatoid periarticular arthritis in one set of joints and hypertrophic or destructive osteo-arthritis in another. Other definite types are readily discernible. There have been all sorts of classifications for chronic arthritis, and to the casual reader no doubt each one adds to the general confusion. It is for this reason that the American National Committee on Rheumatism has adopted the classification of Nichols and Richardson which is based on pathologic and roentgenologic changes and divides arthritis into two groups, proliferative and degenerative. Goldthwaite, in speaking of these same types of arthritis, used the terms atrophic and hypertrophic, respectively, and the latter are the terms usually used in referring to these types of arthritis. The atrophic type includes those cases in which periarticular involvement is marked and bony atrophy is shown in the roentgenogram; the hypertrophic group includes those which do not show much periarticular involvement, but hypertrophy at the bone and joint margins with perhaps degenerative changes in the deeper portions of the joint.

For purposes of orientation the analogous classifications in most common use are compared thus:

Author	Classification based on	Two main divisions
Nichols and Richardson (American)	Pathologic data	Proliferative and degenerative
Goldthwaite (American)	Pathologic roentgenologic data	Atrophic and hypertrophic
Garrod (English)	Clinical data	Rheumatoid and osteo-arthritic
Fischer (English)	Anatomic site	Synovial and chondro-osseous

Although the classification of Nichols and Richardson is a good working basis it is still open to many criticisms. Many believe that both the major divisions have a common infectious basis and should therefore be simply called "chronic infectious arthritis." If a classification based on etiology could be formulated it would be more acceptable. In our experience it seems evident that several instances of hypertrophic arthritis may be entirely different entities, from entirely different causes. For example, the hypertrophic arthritis of a Heberden's node, of symptomless senile lumbar spondylitis, or of a gonorrheal knee, have little in common with each other or with the hypertrophic "baseball-finger" joint, with the hypertrophy of a "typhoid spine," or with the late stage hypertrophy of nonspecific infectious arthritis. A roentgenologically similar pathologic response is their only point of common identity. It would seem therefore that a classification is not complete with a pathologic response as the sole basis of differentiation.

A CLINICAL CLASSIFICATION

The Mayo Clinic has adopted, with due regard to its limitations, a clinical classification based on presumptive etiology, the basis of which seems justifiably supported by a study of the clinical data and course of the various types. Although it includes more than thirty types or variations of arthritis, it nevertheless indicates only five great clinical divisions. These five divisions result from the five great causes of joint-trouble which are, practically speaking, the five causes of all disease: (1) infections and their toxins, (2) trauma, (3) retrogressive tissue changes (senescent phenomena), (4) chemical disturbances (gout and hemophilia), and (5) trophic disturbances (Charcot's disease). The joints therefore seem subject to the same insults that affect other tissues.

GENERAL CLINICAL CLASSIFICATION OF ARTHRITIS

1. Infectious arthritis
   - Known to be specific infectious
     - Tuberculous
     - Gonorrheal
     - Pneumococcic
     - Typhoid
     - Syphilitic (spirochetal, not arthropathy)
     - Staphylococcal (septic)
   - Probably specific infectious (with toxins)
     - Rheumatic fever (streptococci or their toxins)
     - Arthritis with amebic colitis (amebic or secondary streptococci or their toxins): rare
     - With ulcerative colitis (secondary streptococci or their toxins): rare
     - With certain skin diseases (impetigo contagioso, psoriasis)
   - Nonspecific (chronic infectious type)
     - Articular nonspecific infectious arthritis
     - Nonarticular localization (myositis fibrositis, lumbago)
2. Traumatic arthritis
   - Extrinsic trauma (generally acute): (1) articular (traumatic, baseball fingers), and (2) nonarticular (nun's knees and housemaid's knees, sprains, strains)
   - Intrinsic trauma (generally chronic): postural arthritis, static arthritis of obesity
3. Senescent arthritis
   - Fingers (Heberden's nodes)
   - Hips (morbus coxæ senilis)
   - Hypertrophic spine of the elderly
   - Knees (often in combination with static arthritis of obesity)
4. Gouty arthritis
   - Acute (recurring with complete remissions)
   - Chronic (progressive with residual deformity)
5. Arthropathy
   - Secondary to lesions of the central nerv-

ous system (syringomyelia, Charcot's disease)

Secondary to certain lung conditions (pulmonary osteoarthropathy)

Accurate differentiation of the various groups and types of chronic arthritis is essential not only for prognosis but for treatment. One program of treatment applied indiscriminately must often end in failure for there is no one plan of focal removal, one diet, or one method of medication for all cases of arthritis. For chronic arthritis a simplified condensation of this classification is as follows:

Chronic infectious arthritis: (1) specific and nonspecific, and (2) articular and nonarticular (periarthritis)

Chronic traumatic arthritis: (1) extrinsic trauma (generally acute), and (2) intrinsic trauma (generally chronic), for example, static form of obesity

Chronic gouty arthritis

Chronic senescent arthritis

In each there is a clinical basis for the presumptive etiology. In chronic infectious arthritis the basis is (1) presence of foci from which positive experimental lesions can usually be produced in animals, and (2) the important evidences of systemic infection with toxemia: namely, the progressive polyarticular course, the secondary anemia, alterations in blood sugar, metabolism, reduction in gastric acids, afebrile tachycardia, mild albuminuria, vasomotor phenomena such as cold, sweating extremities and lowered blood pressure, the weight loss, loss of appetite, adenitis, and complications of iritis, pleurisy, and pericarditis. The basis of diagnosis in chronic traumatic arthritis consists of: (1) its manifestations strictly limited to traumatized joints; (2) lack of systemic geography or polyarticular progression; (3) lack of systemic signs of infection (and toxemia) or infectious complications; and (4) evidence of relief chiefly if not solely by removal of inciting trauma.

The diagnosis of chronic gouty arthritis rests on the character of its preliminary course of acutely recurring arthritis with complete remissions followed by the chronic course with its typical "signs": the tophi, high uric acid and evidence of secondary nephritis and the general lack of the scondary manifestations of infection, such as anemia and tachycardia. The differentiation of chronic senescent arthritis is based on the late appearance, mild progressive course, minor symptoms, localization in certain joints, such as the spine and distal phalangeal joints, hips and knees, and absence of infectious phenomena.

VARIOUS CAUSES OF CHRONIC ARTHRITIS

Certain authors believe that a familial arthritic diathesis cannot be doubted. Members of certain families seem more prone to rheumatic diseases than others. In some instances heredity undoubtedly acts as a predisposing factor; in others, it may be merely a question of common errors of general and focal hygiene. In the types designated here as "infectious" it would seem that there must be a virulent organism as a cause. The presence or absence of focal infection, however, is not the sole explanation, for weighed against it there is always the resistance of the individual person. A patient's arthritic status may change, although his foci do not, because his resistance is variable.

Hence the relationship of the predisposing and aggravating factors of exposure to sudden barometric or temperature changes, natural or surgical alterations in endocrine function, exposure to unrelated infectious diseases, and so forth. Hence also the rationale of many nonspecific measures of treatment: the stimulation of resistance by maintenance of general health, the application of metabolic stimuli by treatment with products of the thyroid gland, high calorie feedings, proper elimination, the more general physiotherapeutic measures, such as sunbaths, tonic exercises, the maintenance of normal weight, all of which are supposed to keep up and increase the immune bodies (whatever they may be) present in the blood.

The natural tendency for the human body is to resist harmful influences such as too much heat, too much cold, too much or unsuitable food and the harmful germs everywhere. If through abuse of our bodies by one means or another, by mental and physical fatigue persistently present, this resistance is lowered, arthritis of one form or another may develop.

TREATMENT

At The Mayo Clinic for many years the orthopedic section was responsible for the care of patients with arthritis, but as their number increased, with a realization that these patients

were in need of further treatment, medical aid was sought. This resulted in a combined "arthritis-medical service." By this arrangement the orthopedic service carried out only what it rightfully should, that is, the surgical treatment, the application of appliances and collaboration in the supervision of physiotherapy. Although treatment can be roughly divided into medical, surgical and orthopedic, an absolute separation of authority is not to the best interests of the patient and the combined efforts of both groups are advantageous both for the early "medical phase" and the later "orthopedic phase" of the disease.

The treatment depends largely on the etiology and the clinical type of arthritis presented. Certain significant variations of treatment are made for the different clinical forms, the differences being mainly the adoption of radical or of conservative focal removal, prolonged or intermittent physiotherapy, regard or disregard for special dietary instructions, and the rigid or variable application of vaccine and medical treatment. A brief outline of comparative treatment is shown in the tabulation.

CHRONIC INFECTIOUS ARTHRITIS

Nonspecific Form.—In this form the ingenuity of the physician and the resources of the patient are most sorely taxed. Its characteristic is one of prolonged progression and although in a sense it is self-limiting, it does not bound its course by the days or at most the few weeks which many of the more specific forms often do. Whereas the complicating arthritis of the infectious diseases of known etiology, such as pneumonia, typhoid, gonorrhea, or the generally mild postoperative forms, usually burn more or less acutely to a rapid inactive residue, a disheartening span of years usually comprises the activity of nonspecific infectious arthritis.

Because of the grave potentialities of chronic infectious nonspecific arthritis, it is doubtful if a conservative attitude is ever justified for any possible, even questionable, focus as long as progressive activity of the arthritis remains, if the general condition of the patient will permit such removal. Until the exact influences and ramifications of focal infection are demarcated, only a judiciously radical procedure seems fair to the patient. The regrets over late discovery of a focus, heretofore ignored, are more real than those over the early removal of a possible focus on fair grounds of suspicion. Judgment and experience will indicate how far the program of radical removal shall extend. In short, "questionable" fibrous tonsils, devitalized teeth or roots are generally best removed. On the other hand, the vexing problem of intestinal infection with toxemias seems unsettled and except for surgical removal of clearly infected cul-de-sacs, gallbladder and appendix, we are conservative in treatment of the intestines, relying for the most part on normally eliminative diets and nonlaxative adjuvants. Promises of relief by removal of foci should be as conservative as the removal itself should be radical. Two decades of disappointment adequately prove that the removal of a focus will only occasionally be promptly followed by spontaneous recovery. The joint lesions are not often apparently the result of toxins alone, but seem to be the result of actual metastatic implantation of germs elaborated at a primary and distant focus. The removal of distant foci does not, therefore, "remove the poison" when the metastatic joint infection is firmly implanted.

The theory of focal infection has been advanced chiefly by the American field of medicine. In spite of its failures and the variability of immediate results from removal of foci, it is interesting to note that in Glover's report to the Ministry of Health in England the following statement was made: "The theory of focal sepsis has brought fresh hopes into the outlook upon chronic arthritis, and rightly considered, early acted upon and soberly applied, it greatly improves the prognosis of at least half the cases."

The popularity of physiotherapy has endured for fifteen centuries, and yet the ancients' lesson of the hot bath, the soothing cold compresses, and the "laying on of hands," seems to have been more appreciated, in this country at least, largely by the cultist. An impressive percentage of patients turn to his services, often with undeniable improvement, from the physician who relies on removal of foci or salicylates alone. Physiotherapy applied daily over a long period of time by trained physicians or physiotherapy technicians is a form of treatment which few patients can afford and few localities in America offer. We have little to compare with the innumerable natural and artificial community Spas of Europe. Until the number of trained physiotherapists is sufficient, the patient will have to

learn to help himself by simple home methods. Even where available, the daily inconvenience and expense of professional service is soon refused by the patient who would gain much more by a combined program of his own daily physiotherapy supplemented by periodic professional supervision. The importance of daily adequate self-treatment by means of the simple electric baker, hot and cold compresses, contrast baths and showers, hot baths, simple yet specific exercises, if necessary hot sand or salt bags, is evident. For the more fortunate or the more desperate patient a prolonged stay in a warm equable climate is indicated, but even then is too often more palliative than curative.

The English surgeon is probably correct who insisted that all arthritis of whatever primary cause is influenced and modified by trauma. Even the physiologic trauma of normal weight-bearing seems to lower the resistance of the joints of the lower part of the back and the lower extremities so that they are the most common sites of infection. Whenever abnormal trauma is superimposed, by obesity, by pronation defects in the feet, or other postural defects, these need special care. Especially in obese patients with diffuse infectious arthritis must the superimposed trauma of abnormal weight-bearing be removed from the doubly irritated lower extremities by weight reduction, and mechanical supports as needed.

Rare is the patient with arthritis who has not been advised regarding an arthritic diet; such diets are generally defined as restrictions in proteins or carbohydrates, in general or in particular, depending on the mode of the day. The cycle of dietaries for arthritis continues to revolve. After 1683, when Sydenham first attempted to differentiate various types of arthritis, the cycle can be followed through the protein restrictions of one, the carbohydrate restrictions of another, and the full diet of still another. The carbohydrate restrictions of Kelly and Palier are again reflected by those of Pemberton, and the full diet of Spender and Garrod is championed once more by Osler and Billings. In a critical review of rheumatic dietaries, there does not seem to be a diet for the disease, although there may be a definite diet for the patient with disease. In general, except in the obese, a high calorie anticonstipation diet seems to be indicated.

Autogenous vaccines are theoretically potent, but are generally disappointing. However, if their specificity is fortified by positive results of animal experimentation, autogenous vaccines seem justified. Until a more specific form of treatment is afforded we believe that typhoid vaccine given intravenously in spite of its percentage of failures and unpleasant reactions gives justifiable results.

There is no specific medical treatment for chronic infectious arthritis. Salicylates reserve their brilliancy for rheumatic fever alone. However, analgesic medicines should be given fairly liberally, not only because the pain demands amelioration, but because of the psychotherapeutic effect. If the physician denies the patient medicine of some sort, a substitute in the form of one of the hundreds of rheumatism cures is usually obtained. Iodides and arsenic, our heritage from Garrod, will continue to be used sporadically. Hydrochloric acid and tonics will be indicated for the often associated achlorhydria and anemia. Intestinal antiseptics are ardently advocated by some.

In severe progressive cases in which all other measures fail, certain more radical procedures may be justified in the nature of experimental treatment. In a case at present under our observation, experimental malarial inoculation after the method used for tabes has been followed by definite increase of joint mobility (30° in some joints) and lessened pain. After four malarian paroxysms, they were stopped by quinine. In one desperate case distinct relief has been obtained by lumbar sympathectomy and ganglionectomy; this case will be more fully discussed later.

For the patient with arthritis much may be necessary in the way of painstaking elaboration of the nature of his illness, its relation to other rheumatic conditions to which he has erroneously compared his, the limitations and necessity for focal removal and also the need for an active and prolonged defensive program instituted by the physician but which must be carried out largely by himself. He will appreciate not only knowing what form of treatment he should patronize but what he should abjure. A sympathetic explanation of the basis of the cures into which he has been or will be introduced by anxious friends may restore his confidence in the greater safety and the more efficient inadequacies of recognized medical practice. For groups of patients individ-

ual consultations can be efficiently supplemented by group consultations in the form of lectures. In The Mayo Clinic each week three lectures are given: on the indications and contraindications for rheumatic dietaries, on the causes and treatment of the various forms of arthritis, and on the methods of application and the principles of formal and informal physiotherapy.

Specific Form.—The treatment here differs from that of the nonspecific form mainly in the care of the primary focus. For gonorrheal arthritis specific treatment of foci must be applied to the genito-urinary mucosa, supplemented by specific general treatment (gonorrheal vaccines). For the arthritis associated with psoriasis or with amebic, typhoidal or nonspecific ulcerative colitis, the respectively specific treatment is indicated and often alone seems to control or markedly benefit the condition of the joint. Physiotherapy and other supplementary measures mentioned should also be utilized.

TRAUMATIC ARTHRITIS

Traumatic arthritis, of extrinsic origin, is generally acute. The chronic forms result from the intrinsic trauma of obesity, of malposture or malposition. They are usually periarticular but may be hypertrophic. Static arthritis, associated with obesity, involves only the weight-bearing joints: the knees, lower lumbar spine and sacro-iliac joints and the subastragaloid joints of the feet. The hips seem to be adequately spared and protected against this abnormal trauma. Although there is an obvious endocrine or metabolic alteration which, coincident with the menopause, results in obesity, we believe that it is the obesity and not the endocrine change that here produces the arthritis; otherwise one would not expect it to confine its manifestations solely to the weight-bearing joints, or be relieved often by weight reduction alone.

Weight reduction to as nearly normal weight as possible would seem to be the prime object in treatment. Physiotherapy will give only palliative and restorative aid until the weight-bearing joints are again compensated by weight reduction. Simple orthopedic supports help to restore compensation, such as sacro-iliac support, orthopedic shoes for the pronation defect of the feet, and two-inch elastic bandages applied to the knees. Physiotherapy and supports without weight reduction usually prove ineffective and give only temporary relief.

SENESCENT ARTHRITIS

The simpler forms of physiotherapy are generally useful. Removal of foci does not seem to influence it much. The slow rate of progression is often stopped spontaneously or uninfluenced by treatment. Such patients who consult their physicians do so mostly through fear of what might happen, not what has happened, fear that the mild condition may progress to more severe forms; once reassured they often go their way ignoring the palliation offered.

CHRONIC GOUTY ARTHRITIS

The main treatment is the diagnosis and separation of the condition from chronic infectious arthritis, as which it so often masquerades. The institution of Folin's high protein purin-free diet, with intermittent application of cinchophen and alkali, and with colchicum in the acute attacks, often controls the condition entirely. Typhoid vaccine intravenously has occasionally been of unusual aid in producing a remission during an otherwise uncontrolled acute exacerbation.

SURGICAL TREATMENT

The surgical treatment of the joints in chronic arthritis has to do with the residual deformities encountered in the late stages of the disease, and although rarely used in the earlier stages may be used as an eradicative measure, considering the joint as a focus of dissemination.

Surgical measures may be grouped under the following divisions: (1) so-called conservative measures, such as manipulation, brisement forcé, and so forth, usually with the employment of some fixative apparatus, such as a cast or a brace, to maintain the correction obtained; (2) arthrodesis, an operation reserved for the persistently painful joint, due to the destruction in the joint and not to the pain in the earlier stages; (3) synovectomy, an operation limited practically to the knee-joint; and (4) arthroplasty, an operation reserved for the bony ankylosis, when the fire of the disease has burned itself out and the residual deformities are due to bony ankylosis. Many times more than one, or even all, of these procedures may be applied to one patient at some time during the course of the disease. Physiotherapy in its various phases is a most valuable

adjunct to these surgical procedures and they go hand in hand.

Many patients come through a long siege of chronic arthritis with few deformities demanding attention. This is particularly true of the upper extremity, where considerable deformity is compatible with good function, as seen in the hands, partially flexed elbows, and more or less stiff shoulders. When the same degree of deformity exists in the lower extremities the patient is often prevented from earning a livelihood or enjoying the ordinary pursuits necessary to an enjoyable existence, and this is not because of pain, but because of a poor mechanism for locomotion. If these deformities fail to respond to the ordinary physiotherapeutic measures, then more radical measures are indicated. In some instances rest in bed with traction on the lower extremities will be sufficient to straighten flexed hips and knees. The aim must be to correct the deformity with the least possible trauma to the articular and periarticular structures, and thus retain the maximum of mobility. Some limbs will gradually straighten if put at rest in casts for a few days or a week, and at each change of cast a considerable degree of correction will be obtained. By applying a cast for correction of a flexed knee so that it is quite thick in the popliteal space after it is hardened, a transverse slit will permit of wedging it with either a special clamp or a piece of wood and gradually extending the leg, the front part of the cast over the patella acting as a sort of hinge. However, if the contracture is quite resistant, the patient should be anesthetized and force applied to break the adhesions. This force should be carefully applied and should be almost continuous, with slight relaxations, but not with violent movements as one would use a pump handle. Care must be taken not to cause fracture, for often the bones are markedly osteoporotic and needless tearing and injury must be avoided. It is better to manipulate at two or three sittings rather than injure the joint structures by one too vigorous effort, thus leading to more than necessary loss of motion. After the maximum of correction has been obtained, some form of fixation may be necessary to prevent the recurrence of the deformity, and either casts or splints should be applied. They should be left on only a few days before massage, heat and movements are used, thus preventing the formation of new adhesions. There is no rule to follow; the length of time necessary to straighten an extremity will depend on the reaction of the tissues and the tenderness and soreness that follow the application of the force.

In chronic arthritis, arthodesis is rarely used, but when a certain joint, such as a knee or hip, stays persistently painful after all the other joints have quieted down, it may be best to stiffen it. Such an operation should be undertaken only after careful consideration, particularly if there seems to be any likelihood of further activity of the disease.

Synovectomy is applicable to only a few joints, and is practically confined to the knee-joint. When the synovia is so swollen and thickened that there is no possibility that it will subside to its normal condition, synovectomy in the knee-joint should be considered, and if undertaken at all it should be as complete as possible, including the semilunar cartilage. It is quite possible that such a synovia may serve as a focus for further dissemination of the infection. Movement should be started early after operation or the joint will again stiffen.

In certain cases after the arthritis has subsided, one or more ankylosed joints remain. The patient may be in excellent health but totally incapacitated by the bound joints. For patients in this pitiful condition arthroplasty, often performed on multiple joints, holds out a hope that is not to be lightly dismissed. Needless to say, the operation must be performed in good surroundings, by one skilled in the exacting technic. We have not hesitated to perform arthroplasty on both hips in the same patient, or one hip and one knee, both elbows, wrists, temporomaxillary joints, and so forth. These cases challenge surgery, and the challenge in the proper cases should be accepted. It is much better for the patients to get about by the aid of crutches or a cane than to be bedridden and useless with flexed hips or knees. Even arthroplasty on the fingers may be undertaken. When associated with these cases there is spondylitis deformans with bony ankylosis in the usual flexed position, the performing of any type of arthroplasty on the lower extremities is attended by mechanical difficulties so far as function is concerned; for even if the deformity is corrected, and satisfactory motion obtained by arthroplasty, the flexed spine so disturbs the normal line of weight-bearing that the new joint is of no use.

TABULATION

Type	Removal of foci	Elimination of trauma	Physiotherapy	Dietary restrictions	Vaccine		Medicaments			Educational
					Specific	Nonspecific	Specific curative	Nonspecific curative	Analgesic and tonic	
Chronic infectious	Radical	++	Intensive, prolonged, home and professional	— or +	+	+		+	+	+++
Traumatic	Conservative	+++	Until inactive	+*					+	+
Senescent	Conservative	+	Symptomatic		Can be used for pain				— or +	+
Gouty	Conservative	+	Symptomatic	+++	Can be used for pain		+		+	+++

*In static form.

Each patient demands special study and consideration. Surgical measures rightly considered and intelligently carried out offer to this group of patients, an army in themselves, hope of increased function and happier lives. In chronic conditions such as this, the medical profession must be continually on the alert and try any new procedure that offers any reasonable advantage over the old recognized forms of treatment. Apropos of this it seems justifiable to mention a most startling and encouraging result obtained by the bilateral removal of the second, third and fourth lumbar sympathetic ganglia in a case of chronic infectious arthritis of the progressive type. A woman aged thirty-five years came to the clinic presenting the characteristic picture of this chronic deforming atrophic arthritis. Since the operation by Dr. A. W. Adson two years previously the condition in the lower extremities has not only been arrested but she is free of pain; the sweating and pallor have disappeared and the tissues have approached normal. She is able to walk without discomfort. In the upper extremities where ganglionectomy was not done the disease has steadily followed its chronic crippling course associated with severe pain. Recently the patient returned for operation on the cervical and dorsal sympathetic ganglia. This operation has given the same happy results as the one done for the lower extremities.

Although this is but a single case the brilliant result leads to speculation not only from the point of view of treatment but of etiology as well.

TUBERCULOSIS AND PREGNANCY*

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IN CONSIDERING the question of the relationship of pregnancy to tuberculosis three points arise: (1) that of the influence of the physiological function of the child-bearing on the patient; (2) the benefit to be derived by interruption of the pregnancy; and (3) the economic value of the child. In current literature much is being said concerning the good or evil to be expected by early interference, one school advocating early abortion in each case, discussing only the way it should be undertaken; the other allowing every pregnant tuberculous woman to go through pregnancy and deliver the child. Many are more conservative, believing each case should be a law unto itself and interference undertaken only in selected cases. These fairly well agree that the Turban I or II cases which show signs of progression of the disease under close observation or having a complication of laryngeal tuberculosis should be aborted and then only before the fourth month of pregnancy.

The belief held by many that the offspring of a tuberculous mother has a negligible chance of life or health favors the belief in early abortion. However, the results obtained by the immediate removal of the child from the mother have proven that these children have the same chance of health as a child born of healthy parents.

In regard to the first point, that of the effect of the pregnancy and delivery upon the tuberculous woman, there has been the least difference of opinion. Many who are opposed to interference agree that the effect on the mother may be serious but feel that the shock of the operation necessary for the abortion is of equal or greater danger and prefer to allow the pregnancy to take its course.

Bridgeman and Norwood[1] reported summaries upon 134 patients seen in the obstetrical service of the Johns Hopkins Hospital which were complicated by tuberculosis. Fifty of these patients had abnormal chest signs such as slight percussion changes, indefinite râles or modified breathing, not sufficient for a positive diagnosis. The later histories of these women showed no active pulmonary condition. Of seventeen patients with definite but inactive tuberculosis at the time of delivery, ten were followed for a period of six to twelve years. Seven remained in excellent condition, one had reactivation of the pulmonary lesion one and two years after delivery, one had four subsequent deliveries, during which time the disease remained quiescent until eleven years later, when she went to a sanatorium. A third had a flare-up four years after delivery but when examined six years later was in good general condition. None of the ten patients had died. Thirty-one patients having active tuberculosis during pregnancy were reported. Of the twenty cases observed for a length of time sufficient to ascertain results, two (10 per cent) were improved, eight (40 per cent) were unimproved, and 10 (50 per cent) were dead one year after delivery.

In comparing these twenty tuberculous women with the complication of pregnancy with a group of seventy-two non-pregnant women in the Phipps Tuberculosis Clinic, a definitely unfavorable prognosis was found for the pregnant woman. However, a group of active pulmonary cases in which abortion was performed early in the pregnancy showed a higher percentage of deaths than the group which was allowed to deliver normally. These authors therefore state their belief that the risks of pregnancy are definitely increased by tuberculosis. When the two conditions are present, they advise to "treat the tuberculosis to the uttermost, and disregard the pregnancy."

Litzenberg[2] speaks of the apparent early improvement, found in many tuberculous women after conception. "She may put on fat and look and feel much better after conception, but this benefit is only apparent, is usually transitory and even in those women surviving the labor and puerperium, death is usually hastened—ultimately an untimely end occurs in a large percentage of cases."

*Read before the Inter-urban Academy of Medicine (of Duluth, Minn., and Superior, Wis.) at Nopeming, Minn., on May 16, 1928.

One hundred cases analyzed by Lobenstine[3] of New York Lying-In Hospital showed an aggravation of the tuberculosis in every case. Stewart[4] of Manitoba, in reporting 200 cases of tuberculous women with maternal histories, remarks, "The results are so definitely worse than the average that there may be a fair presumption of specific lack of resistance in tuberculous mothers—the conclusion cannot be avoided that childbirth has a definite place in the etiology of tuberculosis."

Forssner[5] of Stockholm on the other hand believes that pregnancy is a negligible factor in the outcome of the disease. His report of 341 tuberculous women observed for two years following pregnancy as compared with the condition of 396 cases not having been pregnant show no graver consequences for the group of women in Turban I class. A somewhat poorer result was found among the pregnant women in the second and third stages of the disease, but "the difference is so slight that it might be simply the result of chance." He emphasizes the sociological and psychological handicaps such as poor food, extra stress and anxiety which act as factors in this connection rather than the physiological strain of pregnancy.

Professor Krause[6] of Berlin observes that pregnancy and parturition are borne with less consequence by the tuberculous woman than is generally believed. Strassman[7] of Berlin reports 102 women with prior pulmonary disease in ninety-six of whom the delivery was inconsequential.

A study has been made of the women patients entering Nopeming Sanatorium since 1912 to compare the outcome of the disease in those having maternal histories with those never having been pregnant. The total admissions up to May 15, 1928, numbered 2,761. Of these 1,473 were men, 346 children and 942 women. Thirty-one women were discharged as not tuberculous, leaving a total of 911 (32.9 per cent) women with active tuberculosis. Four hundred thirty-nine (47.2 per cent of the 911 cases) gave maternal histories while 422 (51.8 per cent) married and single women had not been pregnant.

The total number of deaths has been 1,432 (51 per cent). Of the 346 children admitted there have been 101 (29.1 per cent) deaths; of the 1,973 men patients, 807 (54.7 per cent) deaths. In the group of 439 women with maternal histories 271 (61.7 per cent) deaths have occurred while for the group of 422 women not having been pregnant there were 253 (53.8 per cent) deaths. From these figures it may be seen that the death rate in the women patients not complicated by pregnancy has been slightly lower than that of the men patients, while the group having tuberculosis either prior to their pregnancy or occurring during term or after delivery have approximately a ten per cent higher mortality than the other women.

A complete study of only 211 of these women has been possible as the chart histories of the remainder did not include the ages of the children. As may be seen by the accompanying table the cases have been grouped in relation to the time of the onset of the tuberculosis in regard to the pregnancy. As these were all sanatorium cases admitted on account of active tuberculosis we have not had the opportunity of observing cases of pre-existing disease unaffected by pregnancy and delivery.

Of the twelve cases developing tuberculosis before pregnancy seven have died. Four women had reactivation shortly after the first pregnancy, two immediately after the second child, having borne the first delivery well. One woman broke down after many pregnancies while four remained apparently well for several years before their disease became active. One patient in whom the disease spread rapidly became pregnant within two months after the first symptoms of tuberculosis. Five of the twelve patients developing tuberculosis during pregnancy were pregnant for the first time. Of this group 9 have died.

With such small figures definite conclusions cannot be drawn. However, it is interesting to note that those women who developed disease within a year or during pregnancy have had the highest mortality while those whose disease did not occur until several years after delivery have a death rate approximating the group with no maternal histories. There have been comparatively few deaths also in those women whose symptoms of tuberculosis developed after a spontaneous abortion or miscarriage. In the ten cases having symptoms of tuberculosis within one year after a miscarriage only one patient has died. These figures cannot be compared with the results following surgical abortions as there

TABLE I.

		Deaths	Percentage
Total Admissions	2761	1432	51.
Men patients	1473	807	54.7
Children	346	101	29.1
Women	942		
Not tuberculous	31		
Tuberculous women	911	528	57.6
Maternal histories	439	271	61.7
Women never pregnant	422	253	53.8

TABLE II

Time of development of tuberculosis symptoms.

Group		No.	Percentage	Deaths	Percentage
1	Before first pregnancy	12	5.6	7	58.3
2	During pregnancy	12	5.6	9	71.3
3	Two months after delivery	42	20	23	54.7
	Two months after miscarriage	6	2.4	1	
4	Two months to one year after delivery	45	21.3	34	75.5
	Two months to one year after miscarriage	4	1.8	0	
5	More than one year after delivery	88	41.2	42	53.4
	More than one year after miscarriage	1			

Six patients in Group 3, one in Group 4, and twelve in Group 5 could not be traced after discharge from sanatorium.

have been no cases in which this has been undertaken. One patient admitted within the past year with a far advanced unilateral lesion complicated by recent spinal involvement became pregnant several months after the onset of the disease. She was admitted when two months pregnant. Surgical interference was discussed but after consultations held with an obstetrician and an orthopedic specialist it was decided that as the prognosis was poor the pregnancy be allowed to continue. A spontaneous abortion occurred a month later, since which time the patient has gained in weight and feels better, but the outlook remains poor.

A table of 211 of the 439 cases with maternal histories whose histories gave the ages of the children is given above.

REFERENCES

1. Bridgeman, E. W., and Norwood, V.: Bull. Johns Hopkins Hosp., 38, 83, 1926.
2. Litzenberg, J. C.: Minn. Med., ix, 129, 1926.
3. Lobenstine, R. W.: Quoted by Litzenberg. Min. Med., ix, 129, 1926.
4. Stewart, D. A.: Pub. Health Jour., 9, 221, 1918. Abstract in Am. Review Tuberc., 11, 577, 1919.
5. Forssner, Hj.: Internat. Conference on Tuberc., Lausanne, p. 155, 1924.
6. Krause: Quoted by David Muthu in Pulmonary Tuberculosis, New York, Wm. Wood and Co., p. 360, 1922.
7. Strassman, B.: Beitrag z. Klin. der Tuberk., 8, 353, 1922.

SOME GREAT ARABIANS

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Saint Paul

We who live in the noonday of Christianity are only dimly conscious of its less happy effects upon the world. The unearthly and beautiful religious light that shone in the first two centuries had, by the end of the third, acquired a resemblance to the torch of the destroyer, a torch that was applied without pity to a large legacy of Greek and Roman culture. In a crumbling empire, embers of pagan learning glowed fitfully, smoldering through the dark ages until fanned into fresh flame by the Renaissance. Today it seems clear that the victory of Charles Martel was two-edged, since much of the survival of the ancient culture, certainly much of its science, was the fault of the Saracen invader. That debt we owe to Mohammed and the Arabian adventure of the eighth and ninth centuries, not to the Christian Renaissance of the fourteenth. It is a point of some irony to consider our lack of gratitude for the conquering sword of the Prophet. While Christian Europe trembled at the advancing wave of the infidel and denounced the unbeliever, his hands gathered up and preserved the shattered culture of antiquity. Wondering Byzantium was astounded at barbarians whose victorious demands included a right to purchase Greek manuscripts.

Within the ninth century the Arabs, who in that space of time had made themselves masters of half of Europe, had also accomplished a far greater thing, a rebirth and indefatigable pursuit of Greek Philosophy and science. The opening years of the century saw them in possession of a handful of odd volumes; at its close innumerable works of the pagan world, done into Arabic, graced their libraries. In the north, that century as well as the following tenth saw the destruction of all the towns of France. The smoke of pillage marked the sky; churches and homes were deserted; the half-wild land was traversed by marauding bands and the people fled to the forests, hiding their very lives away. Paris was reduced to ashes while at Bagdad one could see in the Caliph's palace "a tree of gold and silver spreading into eighteen large branches, on which, and on the lesser boughs, sat a variety of birds made of the same precious metals, as well as the leaves of the tree. While the machinery affected spontaneous motions the several birds warbled their natural harmony." That a nomadic and pastoral people should have accomplished so much in so short a time remains one of the marvels of the world. War had extended their empire from the Indus to the Atlantic ocean; its consolidation was achieved by an astounding multiplicity of intelligent effort. Mohammed wrote, "Science is the remedy for the infirmities of ignorance, a comforting beacon in the night of injustice. The study of the sciences has the value of a fast; the teaching of them has the value of prayer; in a noble heart they inspire the highest feelings and they correct and humanize the perverted."

Naturally, in such a scheme of things, medicine held a very high place. From the Koran comes the admonition, "He who has restored life to a man shall be accounted as if he had restored life to humanity." And again Mohammed, "God has not inflicted diseases upon us without at the same time giving us the remedy."

Under the wise rule of the Eastern Caliphates, Arabic desire for knowledge first found expression in transcriptions from the Greek. Schools of translators arose and a great body of Greek philosophy and science was rewritten into Arabic. Hunayn, biggest of them all, was a Christian Arab. Born in 809, he looms a romantic figure, inspired by the enthusiasm of a later Ghiberti or Donatello. Interested in medicine, he soon found that the road to knowledge lay through the Greeks. Disappearing from men he was one day seen in the streets of a far city by his former friend Yusuf who "one day saw a man with long hair and unclipped beard and moustaches reciting Homer in the street, and in spite of his changed appearance recognized his voice as that of Hunayn. He, being questioned, admitted his identity, but enjoined silence on Yusuf, saying that he had sworn not to continue his medical

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studies until he had perfected himself in the knowledge of the Greek language." This man, striding along the street reciting Homer, was of a piece with an age that built audience chambers encrusted with gold and pearls or sent its rulers into the field attended by a bodyguard of twelve thousand horse, their belts and cimetars studded with gold. He attained, finally, to high estate, becoming the Caliph's physician. Refusing, when first informed by the Caliph, to concoct a poison for one of his enemies, Hunayn was imprisoned for a year. Again brought before his ruler he was given a choice between concocting the poison or dying by the sword of the executioner. "I have a Lord," said Hunayn, "who will give me my right tomorrow in the Supreme uprising, so if the Caliph would injure his own soul, let him do so." Whereupon that prince took him into his own service, having designed this rather curious test to ascertain his physician's probity. Hunayn is remembered chiefly for his rendition of much of Hippocrates and Galen into Arabic.

In the wake of the translators there sprang up a group of original thinkers whose contributions to clinical medicine were of real and lasting value. There was Rhazes, perhaps the greatest of them all, who took his name from the town of his birth, a place near the present capital of Persia. Coming to Bagdad, he was educated there in the last half of the ninth century. This was still the Bagdad of the Arabian Nights, the wonder city of Haroun al Raschid, whose death was at that time a matter of contemporary knowledge. Beautiful and cruel, excessive both in its rewards and punishments, it was a city lit with the genius of an unfolding people. The very air was alive with a spirit of inquiry and in the streets splendor walked hand in hand with the sharp vigor and discipline of war. Haroun's answer to Rome's threat of battle, "Thou shalt not hear, thou shalt behold my reply," was not forgotten by a people who saw the accomplished desolation of the Phrygian plains. Rhazes may have seen the reigning Caliph Almamon who, during his nuptials, showered the head of his bride with a thousand pearls of the largest size. It was the same Caliph at whose command mathematicians, working in the plains of Sinaar, accurately measured one degree of the earth's circumference and whose vizier, inspired perhaps by his master, pledged 200,000 pieces of gold for the foundation of a college in the city. Amidst this general munificence, medicine was not forgotten. Haroun al Raschid's physician received 100,000 dirhams twice a year for bleeding his master and an equal sum for giving him a biennial purgative draught. It is estimated that in his twenty-three years of service at court he received the equivalent of more than seventeen million dollars. To this Utopian picture one cannot forego adding the magnificent gesture of another physician, who refused an invitation from the sultan of Bokhara because the transference of his library would have required the services of 400 camels.

Within this Bagdad of splendid turbulence the drama of Rhazes' life unfolded itself. They were practical, war-bitten men, these early Arabs, expecting results, excusing no failure. Esteeming medicine, they had little patience with its metaphysical side; for them illness demanded relief or cure. The translators had in the end done little more than open the printed book, and words had been found not to be deeds. This practical challenge was ably met by Rhazes. There is, indeed, a story of his later life that shows us, not without humor, how much of challenge he did, upon occasion, offer life. Summoned to Transoxiana by the Amir Mansur, who was suffering from rheumatism, he found it necessary to cross the swollen Oxus on the way. Deterred by the fragile boat and the angry width of the stream, the attendants were obliged to bind him, thus carrying Rhazes across by force. Arrived at Bokhara he tried, unsuccessfully for a time, to treat the Amir. Finally he demanded the best horse and mule in Mansur's stables in return for a new treatment. He then took the Amir outside the city to a hot bath, while horse and mule, saddled, waited nearby. After manipulating his patient in the hot bath for a time he retired to dress, returning robed and with a knife in his hand. Standing over Mansur he threatened him with his life saying, "Thou didst order me to be bound and cast into the boat and didst conspire against my life." The enraged and half frightened Amir sprang to his feet, calling his servants. Rhazes, however, seizing upon the confusion of the moment, fled on his bridled horse, nor did he stop until he had recrossed the Oxus and felt himself in territorial safety. There arrived he wrote Mansur the following letter, "May the life of the King be prolonged in health and authority! Agreeably to my undertaking I treated you to the best of my ability. There was,

however, a deficiency in the natural caloric, and this treatment would have been unduly protracted, so I abandoned it in favour of psychotherapeusis, and, when the peccant humours had undergone sufficient coction in the bath, I deliberately provoked you in order to increase the natural caloric, which thus gained sufficient strength to dissolve the already softened humours. But henceforth it is inexpedient that we should meet." The Amir, cured by the bath and his unwonted activity, conferred upon the astute physician a yearly pension of 2000 gold dinars as well as 200 ass loads of corn. Of his early life we know only that he was an accomplished player on the lute and that he had little use for metaphysics. His interest in medicine was aroused by a dispenser of drugs at one of the hospitals in Bagdad. After a rapid rise, he subsequently became physician-in-chief to Bagdad's great hospital, about the building of which he was consulted. His choice of a site was the outcome of an original and ingenious experiment. He caused pieces of meat to be hung up in various quarters of the city, finally building on the spot where the exposed meat decomposed most slowly. His excellent clinical observation undoubtedly owes much to the interdependence of schools of medicine and hospitals throughout Islam. Such schools, connected with hospital teaching, existed in Bagdad, Damascus, Cairo, and Cordova from the ninth to the fifteenth centuries. There were specialized wards for accident, eye and fever cases, to which attending physicians were assigned cases, according to their specialty. Such advance as the Arabs made was restricted to clinical medicine and pharmacology, anatomy and physiology suffering because of the teachings of the Koran, which forbade dissection. The high level of hospital care is illustrated by the following anecdote.

"In the year 831 (A. D. 1427) I came to Damascus. With me was a gentleman of Persian origin, a man of talent and taste, and of great intelligence. This year he made a pilgrimage to Mecca. When he entered this hospital and saw the food distributed there, as well as all the conveniences and luxuries that were there enjoyed by the patients, he conceived the idea of remaining there, pretending that he was sick, and he did remain for three days. The physician, having come to him in order to ascertain the nature of his disease, and having felt his pulse, at once recognized the real condition of affairs and ordered him to eat the foods that gave him the most pleasure, such as tender chickens, jams, sherbets, and all kinds of choice fruit. The three days having elapsed he (the physician) wrote out a prescription to the effect that a guest should not remain longer with a host who had accorded him three days' hospitality."

At Bagdad Rhazes surrounded himself with students, conducting his bedside teaching very much in the modern manner. His is the first clinical account of smallpox, to the description of which nothing of importance has since been added. It is interesting to note that he did not consider the fever itself as a disease, but rather an expression on the part of nature to find a solution for the disease. His writings were voluminous and many are as yet not available in translation. One of the volumes concerns clinical notes and is entitled "Illustrative accounts of patients, and narratives of unusual cases about which we were doubtful." Because of its acuity, one of these cases is quoted.

"Abdullah ibn Sawada used to suffer from attacks of mixed fever, sometimes quotidian, sometimes tertian, sometimes quartan, and sometimes recurring once in six days. These attacks were preceded by a slight rigor, and micturition was very frequent. I gave it as my opinion that either these accesses of fever would turn into quartan, or that there was ulceration of the kidneys. Only a short while elapsed ere the patient passed pus in his urine. I thereupon informed him that these feverish attacks would not recur, and so it was.

"The only thing which prevented me at first from giving it as my definite opinion that the patient was suffering from ulceration of the kidneys was that he had previously suffered from tertian and other mixed types of fever, and this to some extent confirmed my suspicion that this mixed fever might be from inflammatory processes which would tend to become quartan when they waxed stronger.

"Moreover the patient did not complain to me that his loins felt like a weight depending from him when he stood up; and I neglected to ask him about this. The frequent micturition also should have strengthened my suspicion of ulceration of the kidneys, but I did not know that his father suffered from weakness of the bladder. So when he passed the pus I administered to him diuretics until the urine became free from pus, after which I treated him with Terra sigillata, Boswellia thurifers, and Dragon's Blood, and his sickness departed from him, and he was quickly and completely cured in about two months. That the ulceration was slight was indicated to me by the fact that he did not complain to me at first of weight in the loins. After he had passed pus, however, I inquired of him whether he had experienced this symptom, and he replied in the affirmative. Had the ulceration been extensive, he would of his own accord have complained of this symptom. And that the pus was evacuated quickly indicated a limited ulceration. The other physicians whom he consulted besides myself, however, did not

understand the case at all, even after the patient had passed pus in his urine."

In the field of pharmacology, though the use of drugs was empirical, experimental trial of them left little to be desired. Wishing to test for himself the reputed toxicity of mercury, the practical Rhazes gave some to a monkey, recording the experiment as follows:

"As to pure mercury, I believe it not to be very pernicious; it gives rise to intense abdominal and intestinal pain, but afterwards leaves the body as it entered it, especially if the subject takes exercise. I gave it to a monkey that I had at my house and things passed as I have said. I noted that he twisted himself about, clenched his teeth, and pressed upon his belly with his hands. Calomel, and especially sublimate, are very dangerous and very active poisons. They cause very sharp abdominal pains, colic and bloody stools. The emanations of mercury give rise to paralysis."

In addition to his own writings, semipopular tales concerning Rhazes abound. Though hardly scientific, they convey a taste of the age, thus:

"A young man of Bagdad came to Rhazes complaining of Hæmatemesis. Careful examination failed to reveal the cause or explain the symptom. The patient was in despair, believing that where Rhazes failed, none could succeed. Rhazes, touched alike by his distress and his faith, then proceeded to question him very carefully as to the water he had drunk on his journey, and ascertained that in some cases it had been drawn from stagnant ponds. 'When I come tomorrow,' said he to the patient, 'I will treat you, and not leave you until you are cured, on condition that you will order your servants to obey me in all that I command them concerning thee.' The patient gave the required promise, and Rhazes returned next day with two vessels filled with a water-weed called in Arabic, Ruhlub, and in Persian, Jama-i-Ghuk (Frog's coat) or Pash-i-Wazagh (Frog's wool) which he ordered the patient to swallow. The patient, having swallowed a considerable quantity, declared himself unable to take any more, whereupon Rhazes ordered the servants to hold him on his back on the ground and open his mouth, into which he continued to cram more and more of the nauseous substance until violent vomiting ensued. Examination of the vomit revealed a leech which was the source of the trouble, and with the expulsion of which the patient regained his health."

Becoming blind toward the end of his life, Rhazes refused an operation for cataract on the ground that he wished to see no more of a world with which he was disgusted and disillusioned. Whether this was philosophic resignation or fear of the surgery of his day one will never know. His intelligence suggests the latter and his mind may have dwelt rather uncomfortably on an apt Arabian verse, which runs,

"The physician says to thee, 'I can cure thee,'
When he feels thy wrist and thy arm;
But did the physician know a cure for disease
Which would ward off death, he would not himself suffer the death agony."

The so-called Prince of the Arabians was Avicenna. He was born about 980 near Bokhara in the province of Khorasan. At ten years of age he had memorized the Koran, at twelve he knew mathematics, metaphysics and law. His famous contribution to medicine is the Canon, which remained, as Osler says, "A medical bible for a longer period than any other work." It represents the final codification of Græco-Arabic medicine. The feat of unifying Greek medical legacy with Arabic observation was prodigious and marks Avicenna as a really unusual as well as indefatigable mind.

His description of nervous diseases is remarkable, as witness for example his definition of meningitis:

"Acute sersam is an inflammation or tumor of the envelopes of the brain. The prodromata of this disease consist of headache, disturbed sleep and mental depression without cause. As soon as the process becomes localized in the meninges, the first symptoms developing are restlessness, violent headache and pain in the neck. Occasionally there is epistaxis and slight incontinence of urine. When the disease has fully developed all hope of cure is vain. There is intense fever and mental depression and the patient remains perfectly silent and indifferent to what is said to him. Respiration is rapid and irregular; the thoracic movements are, however, ample and deep; localized or generalized convulsions occur; sleep is disturbed and accompanied by extreme restlessness and hallucinations, the patient cries out and is unable to bear light.

"At the terminal phase of the disease, the tongue becomes paralysed and insensibility is general; if the patient be touched with a (pointed?) instrument, even with considerable pressure, he feels nothing; finally the limbs become cold and the patient dies from asphyxia."

Pleurisy, pyloric stenosis, pneumonia and gastric ulcer all are described. He clearly points out the food-pain relationship in ulcer and in considering a differential diagnosis of pleursy he mentions abscess of the liver, mediastinitis and intercostal affections. The extrinsic muscles of the eye were known to him as were also the lacrimal ducts. He explains the convolutions of the intestine as follows:

"It is to have food remain the proper time in the gut in order that the nutritive material may have sufficient time to become separated from the useless matter. If a man had but a single intestine the food would

be ejected too quickly and he would be obliged to take food all the time."

His knowledge of psychiatry was far from negligible. Love is classed under mental disease, the wily Arab making the following comment upon it:

"And hereby it is possible to arrive at the identity of the beloved person, if the patient will not reveal it, such knowledge affording one means of treatment. The device whereby this may be effected is that many names should be mentioned and repeated while the finger is retained on the pulse, and when it becomes very irregular and almost ceases, one should then repeat the process. I have tried this method repeatedly, and have discovered the name of the beloved. Then, in like manner, mention the streets, dwellings, arts, crafts, families and countries, joining each one with the name of the beloved, and all the time feeling the pulse, so that when it alters on the mention of any one thing several times, you will infer from this all particulars about the beloved as regards name, appearance and occupation. We have ourselves tried this plan, and have thereby arrived at knowledge which was valuable. Then, if you can discover no cure except to unite the two in such wise as is sanctioned by religion, and law, you will do this. We have seen cases where health and strength were completely restored and flesh regained, after the patient had become greatly attenuated and suffered from severe chronic diseases and protracted accesses of fever from lack of strength resulting from excessive love, when he was accorded union with his beloved . . . in a very short time, so that we were astonished thereat and realized the subordination of (human) nature to mental imaginations."

There is extant also an account of his treatment of melancholia.

"A certain prince of the House of Buwayh was afflicted with melancholia and suffered from the delusion that he was a cow. Every day he would low like a cow, causing annoyance to every one, and crying, 'Kill me, so that a good stew may be prepared from my flesh'; until matters reached such a pass that he would eat nothing, while the physicians were unable to do him any good.

"Finally Avicenna, who was at this time acting as prime minister to Alaud-Dawla ibn Kakuya, was persuaded to take the case in hand, which in spite of the pressure of public and private business, political, scientific and literary, with which he was overwhelmed, he consented to do. First of all he sent a message to the patient bidding him to be of good cheer because the butcher was coming to slaughter him, whereat, we are told, the sick man rejoiced. Some time afterwards, Avicenna, holding a knife in his hand, entered the sickroom saying, 'Where is this cow, that I may kill it?' The patient lowed like a cow to indicate where he was. By Avicenna's orders he was laid on the ground bound hand and foot. Avicenna then felt him all over and said, 'He is too lean, and not ready to be killed; he must be fattened.' Then they offered him suitable food, of which he now partook eagerly, and gradually he gained strength, got rid of his delusion, and was completely cured."

Such was Avicenna. More prolific, more various than Rhazes, he occupied a higher place in Arabian medicine though, perhaps, not altogether deservedly.

The greatest surgeon of the Arab world flourished at Cordova in the tenth century. He wrote a treatise summing up the surgical knowledge of his times which was for a long time a classic. It was rich with illustrations of instruments and became a favorite in later medieval schools. The success of Albucasis may be explained by a quotation from him to the effect that:

"The reason why skillful operators do not exist today is that the art of medicine requires time (to learn); he who would practise (surgery) should first study anatomy as given by Galen, in order to know the functions of the organs, their shape, their temperament, their relationship (to other organs), and to know the bones, tendons and muscles, their number and position, also that of the veins and arteries, as well as the regions through which they pass.

"If anatomical knowledge be ignored, mistakes will be made and the patient will be killed."

He was the first to give precise indications for the use of the cautery. For success in operating on abscess of the liver he insists on the necessity of having adhesions between liver and peritoneum since pus will otherwise escape into the abdominal cavity and cause certain death. Dealing with goiter more thoroughly than any of his predecessors he clearly differentiates cancer of the thyroid from ordinary enlargement, stating that the former is incurable and that the latter should only be operated when it presents a small, soft tumor. Albucasis was the first to describe vaginal lithotomy; he successfully performed tracheotomy and advised against operation in hydrocephalus, saying that such children operated on by him all died. In obstetrics he employed craniotomy for large fetal heads. While discussing the treatment for uterine abscess he incidentally draws a clear picture of the speculum and its use.

With this brief glimpse at Arabian surgery one is obliged to make an end. But in so doing, a final anecdote needs telling. The impact of the crusades produced curious contacts between Islam and Christianity, sometimes rarely curious in the field of medicine. Between the eleventh and fourteenth centuries the nobility of Europe slowly acquired the habit of Saracen physicians. That it was an excellent habit the following

memoir of Thabit, a Syrian physician writing in about 1140 A. D., clearly indicates.

"They brought to me a knight with an abscess in his leg, and a woman troubled with fever. I applied to the knight a little cataplasm; his abscess opened and took a favorable turn. As for the woman, I forbade her to eat certain foods, and I lowered her temperature. I was there when a Frankish doctor arrived, who said, 'This man can't cure them!' Then, addressing the knight, he asked, 'Which do you prefer, to live with a single leg, or to die with both of your legs?' 'I prefer,' replied the knight, 'to live with a single leg.' 'Then bring,' said the doctor, 'a strong knight with a sharp axe.' The knight and axe were not slow in coming. I was present. The doctor stretched the leg of the patient on a block of wood, and then said to the knight, 'Cut off his leg with the axe, detach it with a single blow.' Under my eyes, the knight gave a violent blow, but it did not cut the leg off. He gave the unfortunate man a second blow, which caused the marrow to flow from the bone, and the patient died immediately.

"As for the woman, the doctor examined her and said, 'She is a woman with a devil in her head, by which she is possessed. Shave her hair.' They did so, and she began to eat again, like her compatriots, garlic and mustard. Her fever grew worse. The doctor then said, 'The devil has gone into her head.' Seizing the razor he cut into her head in the form of a cross and excoriated the skin in the middle so deeply that the bones were uncovered. Then he rubbed her head with salt. The woman, in her turn, expired immediately. After asking them if my services were still needed, and after receiving a negative answer, I returned, having learned from their medicine matters of which I had previously been ignorant."

And with the gentle irony of that last sentence still in mind we do, finally, make an end.

CASE REPORTS

CONGENITAL SOLITARY KIDNEY

A Résumé with Report of Case Complicated by Ureteral Stricture

EDWARD BRATRUD, M.D., F.A.C.S.
Warren, Minnesota

The urogenital tract is especially subject to various interesting congenital abnormalities. Among these, congenital single kidney or congenital agenesis, an anomaly of number, is characterized by complete absence of the kidney on one side or the other. It is not to be confused with unilateral fusion nor congenital aplasia which, while occurring much more frequently, is a degenerative anomaly.

ETIOLOGY

Complete failure in development of the renal bulb at the base of the Wolffian duct is characterized by entire absence of kidney, ureter, ureteral orifice and ureteral ridge (Fig. 1, A).

Degenerative forms sometimes occur, showing a stump of the ureter with a well-formed ureteral orifice and ridge (Fig. 1, B and C). Associated with this condition are frequently found other anomalies of the urinary and genital tracts in either male or female and these are often isolateral with the renal agenesis.

OCCURRENCE

According to autopsy reports solitary kidney occurs approximately once in 1,600 cases. The literature, however, is very meager in reference to this important condition, less than 400 reported cases being on record.

It seems more frequent in males, although more autopsies are done on male patients.

Bilateral aplasia is of course inconsistent with life so we find the age incidence of single kidney directly dependent upon two factors: (1) Extent of other associated anomalies; (2) nature and extent of disease present in the single kidney, and its resultant effect on life.

The remaining kidney may be normal in location (Fig. 1, A, B and C), may be in a crossed position (Fig. 2, B), in the median line (Fig. 2, C), or pelvic ectopic (Fig. 2, D), similar to the case here reported.

The single kidney is almost invariably enlarged to accommodate the additional function; hence, an enlarged kidney on one side or other should always lead us to suspect the possibility of a single kidney.

A single ureter as in Figure 1, A, B, and C is the rule, usually associated with a dilated pelvis to accommodate the hypertrophic and hyperfunctioning organ. A single ureter crossed to the opposite side of the bladder is sometimes found, as in Figure 2, B.

Double ureters may exist, as in Figure 2, A. In this, case, however, both ureters open on the same side.

The left side is most commonly involved, for unknown reasons.

Renal vessels are usually absent but presence of renal vessels indicates a degenerative condition.

An adrenal may occasionally be present with the kidney absent.

SYMPTOMATOLOGY

The condition may be entirely symptomless; hence, proven cases are reported from autopsy reports unless disease has intervened in the single kidney and called attention to the urinary tract. Some cases, too, are discovered in the course of a routine urological survey.

Without a definite characteristic symptom-complex, therefore, these cases may go on to lead an apparently normal and healthy existence until disease in the kidney itself, disease elsewhere in the body or other untoward factors bring the condition to light.

It is a significant fact that all anomalies of the urinary tract lead to pathological change and this is particularly true here where a double function must be performed by a single organ. Eisendrath has cited a number of cases of anuria in previously unsuspected cases of solitary kidney. This is not surprising in view of the fact that in close to 400 recorded cases of solitary kidney, uremia was listed as the cause of death in 33 per cent. The solitary kidney is subject in a greater degree to the same pathological changes as the bilateral kidneys.

DIAGNOSIS

Inasmuch as most of the recorded cases are from autopsy reports and in view of the lack of definite symptoms, the clinical presence of solitary kidney is usually recognized only in the course of a complete urological survey.

Careful inspection of the bladder with special reference to the trigone and ureteral orifices, ureteral catheterization, color and function tests and complete urography are necessary in order to make the diagnosis.

Cases of solitary kidney have often had operations performed on various organs—gall bladder, appendix, kidney, ureter, prostate, bladder, etc., frequently with distastrous results. Ransohoff has even recorded a number of cases of nephrectomy of solitary kidney.

It should therefore be more appreciated that a man doing general surgery should be fortified by at least a fair knowledge of anomalies of the urinary tract.

In differential diagnosis, we must exclude renal aplasia or incomplete development, which is fully as important but occurs four times more frequently. Occluded renal tuberculosis and renal fusion are also to be excluded in the urological survey.

Medically, the condition is also of great importance, particularly in those patients suffering from kidney symptoms.

CASE REPORT

H. B., a Russian farmer aged 48, was admitted to the hospital March 3, 1926.

Family History—Father died at 78, mother at 73. One sister died at 40, cause unknown.

Previous Diseases.—Rheumatic fever four years ago.

Fig. 1. A, Absence of kidney, ureter and ureteric orifice. Asymmetric trigone. B, absence of kidney but rudimentary ureter with normally placed and formed ureteric orifice and symmetric trigone. C, same as 8, but with rudimentary renal artery.

Complaint.—The patient complained of pain in the right lower quadrant. For the past twelve years nocturia had been present one to three times a night. The past four weeks urgency day and night had been present and the past three weeks burning and halting urination had caused discomfort. There had been upper abdominal distress at irregular intervals associated with belching of gas during the past three years. A dull pain had occurred occasionally in the right lower abdominal quadrant during the past year which seemed worse the last four weeks. The bowels had been constipated, more so the past month. The appetite had been good, there had been no quality or quantity distress, no nausea, vomiting nor disability.

The patient was referred for appendectomy on account of abdominal distress and right lower abdominal pain.

Examination.—The patient was a well developed and nourished male weighing 151 pounds. Considerable dental caries was present. The heart and lungs were apparently normal. The blood pressure was 148-112; the pulse 72.

The abdomen was moderately distended and there was a definite rigidity of the right lower quadrant. In the latter region a definite mass was palpable and tender and had the consistency of a cyst rather than an inflammatory mass.

The rectum and genitalia were essentially negative.

The patient's temperature, blood hemoglobin and cell counts, Wassermann and fractional test meals all were of negative value. The urine contained occasional pus cells and granular casts. The phenolsulphonephthalein was 40 per cent in two hours. The blood urea was 78 mg. per 100 c.c.

Cystoscopy was performed under sacral anesthesia.

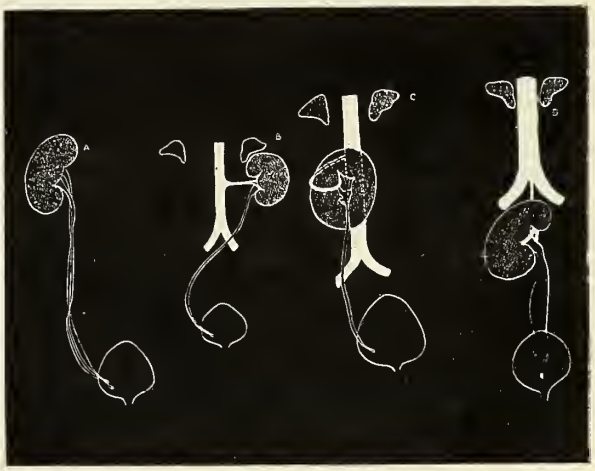

Fig. 2. A, solitary kidney with reduplication of ureters. B, solitary kidney in crossed ectopia position. C, solitary kidney in median line. D, solitary ectopic (pelvic) kidney.

The trigone was asymmetric and there was an absence of the left ureteral ridge and orifice. On catheterizing the right ureter, an apparent stricture was encountered in the lower end of the ureter 3 cm. from the orifice. A No. 7 catheter was passed to the kidney pelvis and a hydronephrosis demonstrated by aspirating 30 c.c. of clear urine. The stricture was dilated to 3 mm. On administering indigocarmin intravenously there was no evidence of other ureteral orifice in the bladder or urethra.

Two days later the kidney function test was repeated and there was no evidence of other ureteral opening.

Urograms.—A large right-sided pelvic ectopic kidney was shown with the upper pole extending to the top of the third lumbar vertebra. Moderate hydronephrosis was present in the large kidney with marked clubbing of the major calices with disappearance of all minor calices. The ureter was slightly tortuous and greatly enlarged in its downward course, with a very marked hydroureter in its terminal portion. There was no evidence of kidney tissue on the left side.

The patient was reexamined a week later, with repetition of color and function tests, with the same results as before. Asymmetry of bladder was very definite. The right ureter was dilated to 4 mm. and the patient much improved.

March 29, 1926. Patient greatly improved generally.

Re-cystoscopy with uniformly the same results as previously.

March 30, 1927. Same as March 29, 1926.

July 11, 1928. Patient complains of slight epigastric distress with occasional nausea. Re-cystoscopy and patient discharged much improved.

The urographic data in this case are so clear-cut and

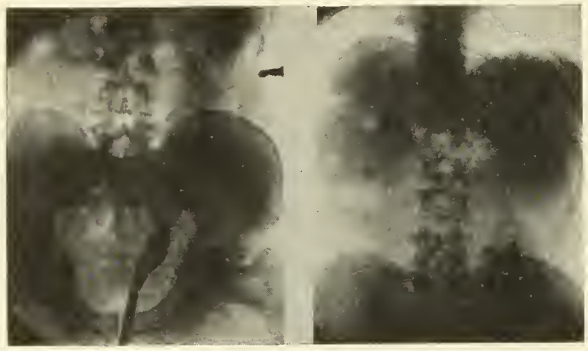

Fig. 3.

decisive that I have no hesitancy in making a pre-autopsy diagnosis of congenital solitary kidney complicated by ureteral stricture.

BIBLIOGRAPHY

1. Anders, J. M.: Am. Jour. Med. Sci., 1910.
2. Bugbee and Lossee: Surg., Gyn. and Obst., 1919.
3. Cabot: Modern Urology, Vol. 11.
4. Cabot's Case Records, Boston Med. and Surg. Jour., July, 1927.
5. Campbell, Meredith S.: Ann. Surg., Dec., 1928.
6. Cosgrove, S. A., and Waters, E. G.: Am. Jour. Obst. and Gyn.
7. Day, R. V.: Surg., Gyn. and Obst., January, 1924.
8. Dorland, W. A. N.: Surg., Gyn. and Obst., 1911.
9. Eisendrath, D. N.: Ann. Surg., 1924.
10. Farnsworth, A. H.: Jour. Am. Med. Assn., 1925.
11. Goldstein, A. E.: South. Med. Jour., 1925.
12. Hennessey, Russell A.: Jour. Urol., February, 1929.
13. Huffman, L. F.: Jour. Urol., October, 1924.
14. Judd, E. S., and Harrington: Surg., Gyn. and Obst., 1919.
15. Keye's Urology.
16. Lyon, M. W., Jr.: Jour. Am. Med. Assn., 1916.
17. MacKenzie, D. W., and Hawthorne, A. B.: Am. Jour. of Surg., July, 1927.
18. Papin and Eisendrath: Ann. Surg., 1927.
19. Peterson, M. C.: Jour. Am. Med. Assn., Nov. 19, 1927.
20. Quinby, W. C.: Bost. Med. and Surg. Jour., 1925.
21. Young's Practice of Urology, Vol. 11.
22. Roeder, C. A.: Jour. Am. Med. Assn., 1925.

MIGRAINE AND EPILEPSY

Two Case Reports

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Saint Paul

Migraine and epilepsy present many features in common, and it is generally believed that a definite interrelationship exists. The history of migraine and epilepsy in the same family or descendants, the periodicity of the attacks, and the occurrence of both migraine and epilepsy in the same individual are among the common characteristics. Alcoholic stimulants even in small amounts have a tendency to increase the frequency and severity of both disorders. Occasionally epileptic seizures are ushered in by typical migrainous attacks. The following two cases present some of these features:

The first case is that of a boy, aged 14, referred to us by Dr. A. Schwyzer, February 25, 1929. The family history is negative except that the maternal grandmother and the mother suffered from migraine. The patient's birth and developmental history is normal. He has had no acute illnesses except influenza at the age of eleven years. He is in the eighth grade in school.

Since his second year, patient has had headaches, unilateral in character, accompanied by "black specks in front of his eyes," of twenty-four to forty-eight hours' duration and associated with nausea and vomiting. These would occur from one to six times a month and were frequently preceded by a period of twenty-four hours during which his appetite was ravenous. They continued until about one year ago. Since then the headaches have been less, both in frequency and severity.

About eighteen months ago he began to notice that in school while writing his right hand would jerk involuntarily and in the direction of the line of his script. There was no cramping of the muscles nor would he drop his pen or pencil. Along with this jerking he would "lose himself for a moment and have difficulty in thinking." These attacks would occur only when he paused in his writing to think of what he was going to put down next. They manifested themselves about twice a week. On February 24th he had a ravenous appetite. On the morning of February 25th while in school he had a generalized convulsion associated with unconsciousness and frothing at the mouth. He remained unconscious for about one hour, complained of a bitemporal headache on awakening, slept the greater part of the day, and in the evening had an attack of emesis. He felt well the following morning. Dr. Harry Ghent saw him immediately after his convulsion and made a diagnosis of essential epilepsy. The neurological and physical examinations were negative throughout. Hemoglobin 82 per cent; blood pressure, systolic 104, diastolic 68; urine normal. A diagnosis of migraine and essential epilepsy was made and the patient placed on luminal and a proteid-restricted diet with limited amounts.

The interesting features in this case are the familial history of migraine, the early onset of migraine in the

patient—two years of age—the gradual manifestations of petit mal, and finally the grand mal attack, followed by an improvement in his periodic headaches.

The second case is a woman, aged 24 years, referred to us by Dr. F. J. Schatz, St. Cloud, Minnesota, July 11, 1928.

Her family history is negative except that one sister suffered from migraine.

Her personal history is negative throughout. The menstrual periods are normal but irregular.

At the age of twenty-two years she began to have headaches. The headache would be preceded for several hours by a "sick feeling" in her head. The pain then would begin in either the right or the left eye, increase in severity and become so intense that she would be compelled to go to bed. It would gradually extend over the head but always remained unilateral, either right or left. This would be associated with nausea, vomiting, photophobia, and occasionally with scotomata. These symptoms would continue from one to five days, and sometime during the course of the headache she would have a generalized convulsion, would be unconscious for several minutes, and this would always be followed by emesis. At first these attacks occurred every two or three weeks but during the past four months, several times a week. She had lost twenty pounds in weight during the past six months.

The physical and neurological examinations were negative throughout. The cranial nerves, fundi, reflexes, and sensation were normal. Her hemoglobin was 70 per cent; red blood cells 3,700,000, leukocytes 5,200; blood pressure, systolic 102, diastolic 70. Blood Wassermann negative; spinal fluid, moderately increased pressure, clear, 1 cell, globulin a trace, Wassermann negative, colloidal gold test, 0111000000. Basal metabolic rate minus 10.

A diagnosis of migraine with epilepsy was made. The patient was given luminal and calcium lactate and a proteid-restricted diet. She furthermore was given a course of sodium bicarbonate intravenously. Following this course of treatment she remained free from headaches and convulsions for two months. After this they recurred in spite of the fact that she was still taking luminal and calcium lactate.

It is difficult to state whether her migrainous attack was an aura preceding the major convulsion or a true migraine. Her description of the headache, however, is typical of a migraine, and in all probability we were dealing with two definite disorders.

538 Lowry Bldg.

President's Letter

THE CONSULTATION BUREAU

AT THE Secretary's conference held at Saint Paul last month, a vast deal of material was presented fraught with much of value to our profession and our patients. To our way of thinking the report of Dr. Pearce's committee on the Consultation Bureau was an outstanding feature. This, in brief, makes it possible for any member of the State Society having a problem in diagnosis or treatment to submit to this bureau any statement regarding the case, together with a request that it be submitted to competent specialists for solution and suggestions as to further procedure. In fact, virtually a long distance consultation. This may be done by mail, or, in the event of urgency, by night letter or telegram. The whole matter is to be treated in a strictly confidential way, only the substance of the communication, without reference to name of the physician making the request, being referred by the bureau.

It is contemplated that this service shall be most expeditious, answers to requests being returned the same day they are received and by wire if so requested.

Applications should be sent direct to the office of the Secretary, who in turn will transmit them to the Consultation Bureau. This bureau will consist of Dr. N. O. Pearce, pediatrist, of Minneapolis; Dr. E. M. Hammes, neurologist, of St. Paul; Dr. F. J. Hirschboeck, internist, Duluth; Dr. G. E. Brown, internist, Rochester; with Dr. W. A. O'Brien, Assistant Professor of Pathology in the University Medical College, in direct charge. Dr. O'Brien's broad and varied knowledge, together with his wide acquaintance, will enable him to bring to his assistance in the shortest possible time all available authority on any given problem. We anticipate a ready response for this service and offer congratulations to Dr. Pearce on the fulfillment of a long cherished ambition.

EDITORIAL

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RABIES

Shall Minnesota return to the days of 1914, in which year in Minneapolis alone there were an average of five rabid dogs per week during the first seven months of the year?

Prior to December, 1920, rabies had been continuously present in this State for a period of twenty-five years. Heavy losses of domestic animals other than dogs had been sustained and not less than 18 persons had lost their lives. Much expense was involved in securing preventive treatment of bitten persons. In one instance between twenty-five and thirty persons of one small village, approximately 10 per cent of its population, underwent treatment at a private Pasteur Institute in Chicago. By legislative enactment Pasteur treatment was furnished free to Minnesota residents in 1907. Over 1800 persons received antirabic treatment between 1907 and 1921 when by legislative act, on recommendation of the State Board of Health, this work ceased.

There was no rabies in Minnesota from December, 1920, to December, 1925, when it was introduced into Traverse County in all probability from South Dakota. Prompt action of the State Live Stock Sanitary Board in tracing contacts and imposing restrictions on dogs resulted in stamping out the disease by May, 1926, but not until it had invaded three additional counties.

In the autumn of 1927 an outbreak of rabies occurred in sparsely settled Lake County along the lake shore drive. It remained unrecognized until late in December. Then in spite of prompt action by the Live Stock Sanitary Board it apparently spead to St. Louis, Itasca and Carlton Counties in 1928. Rabies has since appeared in Chisago, Ramsey, Washington and Clay Counties. One outbreak in Ramsey County was in a dog brought in from Omaha, Nebrasks. It has been necessary for at least twenty-four persons of this State to receive antirabic treatment during 1928.

Withal it is surprising that Minnesota has had so little rabies since 1920, for during the past few years the disease has been on the increase throughout the country. Reports indicate that no state has escaped rabies at some time during the past two years. Incomplete reports show that at least sixty-eight persons and 1,600 lower animals succumbed to rabies in the United States during 1928.

The enormous increase in tourist traffic with a proportionate increase in out-of-state dogs on the running boards makes the rabies problem increasingly serious.

Through the judicious restriction of the dog, rabies has been banished from Sweden, England, Ireland, Holland and kept from entering Australia and New Zealand. Restrictive measures have held this disease at low ebb over long periods in certain other European countries, in Canada and in parts of the United States.

The State Live Stock Sanitary Board, under

which control of rabies in lower animals falls, up to the present legislative session has been limited to placing restrictions on dogs in localities located within a twenty-five mile radius of the sanitary district in which a case of rabies occurs. When it is known that the rabid dog in the infectious stage may travel on his own legs a distance of fifty to one hundred miles biting persons, dogs, and other domestic animals along his trail, it is obvious that such limited powers for control are inadequate. A show dog en route from Seattle to Toledo died and was removed from the train at St. Paul. Examination showed that this dog had died of rabies. This dog had bitten three express men along the journey.

Because of the known facts relating to the spread of rabies and its successful control our present legislature has wisely passed a bill which gives the Sanitary Board power to extend protection, through restrictions of dogs, to such communities beyond the twenty-five mile limit as the Board may deem peculiarly endangered.

Such facts further indicate the desirability for further action leading to uniform State Laws for the control of rabies and the rigid enforcement of same.

O. McDaniel, M.D.

EARLY DIAGNOSIS OF TUBERCULOSIS

April is the month which has been designated this year by the National Tuberculosis Association to call special attention to the importance of early diagnosis of tuberculosis. Last year it was March. This year the early diagnosis of glandular tuberculosis in children is being particularly stressed.

In an editorial last month we pointed out the need for more activities directed towards the prevention of tuberculosis in adolescent girls particularly. We are glad to aid in the national campaign which is being undertaken this month not only by the National Tuberculosis Association but by the state, county and city tuberculosis groups. The Minnesota Public Health Association is conducting tuberculosis activities in our state and will send out pamphlets to members of the profession emphasizing the importance of early diagnosis of the disease, as was done last year. Two postgraduate courses, one at Lymanhurst and the other at the State Sanatorium (announced elsewhere in this issue) will be a part of the campaign. The leading article in this issue by Dr. J. A. Myers, president of the Minnesota Public Health Association, emphasizes certain points of importance in the early diagnosis of tuberculosis.

Certain facts regarding tuberculosis have been fairly well established. Tuberculosis is an infection, is commonly contracted in infancy or childhood when hilus tuberculosis is likely to follow healing of a primary focus in one of the lower lobes of the lungs. Also, active pulmonary tuberculosis is likely to develop in early manhood or womanhood when the individual's lowered resistance allows the early glandular infection to flare up.

Early positive diagnosis of glandular tuberculosis of the lung hilus is as a matter of fact a difficult matter. Emphasis should therefore be placed upon the importance of general hygienic measures throughout childhood and youth, especially where there is any reason to suspect tuberculosis exposure or infection in early life.

ROENTGENOLOGY, RADIOLOGY AND SKIAGRAPHY[1]

The writer has just listened to three admirable papers delivered before the Council on Medical Education.[2] The authors traced the development of *x*-ray from discovery through to its present day application in practice. It seems that whole-time hospital salaried positions are coming to be the choice for our best trained men. Those with teaching medical school connections are apparently best situated. However, a note of sadness pervaded some of their discussion. They rightfully dislike becoming "institutional employes" rather than whole souled medical specialists, offering to or merging their opinions with physicians in general. In other words, they hold rightly that it is not their province simply to "build up a series of technical procedures"; nor may they be expected to use and sell "celluloid film at so much per square inch."

One speaker held that the expense of equipment and complexity of technic made isolated office practice of roentgenology unsatisfactory—hence the drift toward hospital centralization. Now, the present-day heart of the hospital has

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[1]Nomenclature is more than a mere matter of form. Each term is distinctive. Chairman P. M. Hickey, of Detroit, asked for clearer definition to assist at least in outlining the field and in indexing the literature.

[2]Annual Congress on Medical Education, Medical Licensure and Hospitals, the A. M. A., Chicago, Feb. 18 to 20, 1929.

shifted a little from the record room to a proper use of its records in staff conferences. Here it is that all specialists must lose their "splendid isolation" and combine for a friendly grouping of the best that everyone concerned is able to establish. In this way are the patient's interests safeguarded and the hospital's reputation enhanced. Not only must the roentgenologist lose some of his dogmatism but the internist, surgeon and orthopedist must also slough off some of that self-sufficiency born of tradition and fostered by public esteem. All doctors are going to use the *x*-ray. It is so with the stethoscope. We need only recall that in the great Laennec's time there were not only those who became "stethoscopists" but others who roundly decried its use. It is useless to state that the simplicity of the stethoscope should not be compared with the complexity of the *x*-ray: it was a far more revolutionary step, in its time, for the profession to accept Laennec—and all his approach to chest diagnosis implied—than for our generation, surfeited with objectivity, to accept Roentgen. Stockholm is admittedly one of the greatest present-day centers for advanced roentgenology. Yet, we are told that the men making it so have not cut themselves off from practice in some other lines. Are we not all drifting back closer and closer to basic studies and understandings? Are we not more and more suspicious of him who, annoyed or perplexed by the elaborate confusion of practice, seeks solace within the limits of a narrow field? Obviously, roentgenology is not a narrow field—provided he who enters it has the necessary background and training. However, he must be more than a medically minded technician. Admittedly, he must have the closest touch with dermatologists to treat skin lesions safely; with orthopedists and surgeons, at least, in order to keep in touch with them. To the broadest type of general diagnostician comes the feeling that the correctly poised, disposed and trained roentgenologist is already an internist.

The days of enormous incomes for certain surgeons and internists is passing in most normal communities. The question of income and emolument is never easily adjusted. Cloistered hospital medical "employes" should not be afraid to stand up for their just rights, but first of all they should prove to the rest of the staff their capacity to teach, to guide and to develop better approaches to diagnosis and treatment. "One man" domination in hospitals is rapidly disappearing. In fact, with objective disease under greater and greater control and subjective discomfort in a tired and luxury loving population increasing, the domineering figure of medicine in the future may not be the man with the scalpel or even an *x*-ray, but he of the subtle, understanding, synthesizing mind.

E. L. T.

QUESTION AND ANSWER COLUMN

For some time we have wished that a Question and Answer column could be run in the journal for the benefit of our readers. Almost daily some question in connection with practice arises in the mind of every practitioner. If he has close association with other members of the professon he is likely to put the question in his mind to someone and get some sort of answer. Many of us, however, might appreciate an opportunity to obtain answers from authoritative sources.

Heretofore, Minnesota Medicine has not felt it advisable to attempt an undertaking such as a Question and Answer column inasmuch as there has been no mechanism for the proper handling of such an activity. The Committee on Medical Education of the State Medical Association, of which Dr. N. O. Pearce is chairman, after due consideration has arranged for a staff of consultants who will furnish free to members of the Association information on any subject relating to practice. The undertaking has received the approval of the Council, and the services of Dr. William O'Brien, assistant professor of pathology at the University of Minnesota, have been obtained as director of the Bureau. There is every reason to believe that this is the beginning of a very valuable service to Association members.

The Bureau in addition to furnishing medical consultation will conduct the Question and Answer column for the journal each month, and its interest will depend on the use made of the Bureau. Questions should be sent to the Consultation Bureau at the Association office. There need be no fear of publicity in the matter as all communications will be considered confidential. The announcement of the committee appears elsewhere in this issue.

HISTORICAL COMMITTEE

In these days when the world is so small that we can cross to Europe in thirty-three hours or less, and it is not at all unusual for a patient to appear here with some tropical disease, still it may surprise many of you to know that the Asiatic Cholera took its toll of death in this country and that it was carried by immigrants into Minnesota. Its inroads in Saint Paul were of sufficient importance to stimulate the city to establish a Board of Health and appoint a Health Officer. Believe it or not, but two of our physicians contracted the disease and died of it. We have their names but not their pictures; however, we did secure a picture of the health officer and it took considerable detective work and ingenuity to get it. We are proud of that piece of work. The last death from Asiatic Cholera occurred in Minnesota as late as 1866.

An error was made in our last month's contribution. Dr. Stewart's initials were given as J. S. His name was Jacob Henry Stewart. Please note the correction.

We can keep this up a little longer, but we cannot complete our historical records without your aid. Dr. H. M. Workman of Tracy will receive and record all medical historical information you may send. Do it now.

J. M. A.

THE COUNTRY DOCTOR

Because he sought not wealth or fame,
He wore no conqueror's crown in life
And at his death no drums were heard.
Yet all who knew him mourned his passing—
The learned judge, the meek housewife,
The well-groomed banker and bronzed drayman,
All came to pay a last tribute
To him who in their hour of need
Had brought them comfort and new hope.
Each home had known his ministry;
Strong men his friendly counsel sought
And little children smiled through tears
Into his kindly wrinkled face.

He's gone. No more, through dark and storm,
On lonely roads, his muddy carriage
And work-worn horse are seen. But still
His memory, like cooling showers
Upon a drought-parched plain, lives on
In lives made better by his service.

—W. T. H. in *Garard Review.*

MISCELLANEOUS

ANNUAL REPORT OF THE UNIVERSITY OF MINNESOTA MEDICAL SCHOOL FOR 1928

To the President of the University:

Sir: The Medical School has had a prosperous year. Again the number of students has taxed our facilities and staff. We are now graduating about one hundred twenty-five each year from the medical course. Fifteen years ago the graduating class numbered forty-five.

ATTENDANCE

By regents' action the number of regular freshman medical students is restricted to one hundred. These are chosen from three hundred or more applicants early in July of each year. However, there is always a considerable number of worthy applicants who have small deficiencies and who cannot be regular freshmen under the rules of the school. To hold these back a full year would often work an injustice and serve no good purpose. They are therefore accommodated as unclassed students and given a special program. By attending the subsequent summer quarter they become regular sophomores and save a year's time. The sophomore class therefore numbers one hundred fifty or more.

The school and the large body of irregular students are under obligation to Dr. C. J. V. Pettibone, secretary of the Students' Work Committee, for the excellent handling of the group of irregular students, a difficult and time-consuming task.

When we come to the junior and senior years we try to hold to one hundred twenty-eight or sixteen sections of eight students in each class, as the number who can be accommodated by present hospital facilities. Our seniors work at the University Hospital, Minneapolis General Hospital, Glen Lake Sanatorium, and next year we shall send them for obstetrics to the Ancker Hospital (hitherto used only for juniors). We owe much to these institutions and are greatly indebted to Dr. List, Dr. Mariette, and Dr. Carter, superintendents respectively of the affiliated hospitals named above, and to their managing boards.

It will be seen that we are taking care of well over six hundred undergraduate medical students—nearly the largest number in any medical school in the country. Besides this the Medical School in its larger sense as an administrative unit educates about four hundred nurses, trains a considerable number of technicians, social workers, dietitians, and embalmers, conducts (with the Extension Division) numerous short courses for physicians in practice, and finally, through its departments, contributes to the education of dentists, physical education and home economics students, graduate students, and other university groups. The registration statistics of the Medical School, which will be found in the registrar's report, indicate therefore only partially the numerous activities of this branch of the University.

INTERN YEAR

The intern year as a requirement for the M.D. degree was first instituted by the University of Min-

nesota. The plan has been in operation over ten years now and has worked well. Our men get excellent internships all over the country. The Internship Committee has done important work in investigating the educational opportunities of hospitals and in placing our students. Dr. Litzenberg has been chairman from the inauguration of the required internship. Our debt to him is very large.

FACULTY

The faculty has been hard working and harmonious. Under the new and small Administrative Committee the details of management have been taken care of with a minimum of time and effort. No important faculty changes have been made. Promotions will be found listed in the president's report. The most important teaching change of the year was the organization of obstetrics and gynecology at the Minneapolis General Hospital on a university basis under Dr. Adair. This is a step in the direction of two university clinics in each major clinical subject. We now have two such clinics at the General, the other being medicine under Dr. Fahr. The policy is to organize and support these General Hospital clinics on the same basis and standard as those at the University Hospital.

Our faculty is increasingly called upon for addresses before scientific and medical gatherings. Notable trips during 1927-28 outside the country were those of Dr. Schlutz to the Argentine (as guest of the medical society there) and other South American countries, and to Havana; and of Dr. Berglund to Sweden.

RELATIONS WITH ALUMNI AND PROFESSION

A matter for congratulation during the year is the closer alliance with the alumni, brought about under the presidency of Dr. O. S. Wyatt of the Medical Alumni Association. The alumni banquet held June 13 during the meeting in Minneapolis of the American Medical Association was most enthusiastic. Over seven hundred graduates were present. This is reported to have been the largest gathering of Minnesota alumni ever got together, even exceeding any meeting of the General Alumni.

Under Dr. Wyatt's leadership plans are in making for an annual medical homecoming, with lectures and clinics as well as social features to bring back and interest our graduates. Dr. Wyatt's slogan is the "Alumni University." The Alumni Advisory Committee keeps in touch with the educational policy of the school and coöperates with the dean.

The school acknowledges its obligation to Dr. Wyatt for his devotion and intelligent work with the alumni, to Dr. N. O. Pearce for his service as chairman of the Extension Committee which conducts in coöperation with the state association increasingly valuable short course for physicians at different centers, and to Dr. W. J. O'Brien for his important work for the doctors of the state. At the present time relations with the alumni and the organized profession are good. There are still individual physicians who think there is ground for complaint—that the University Hospital and Dispensary take as charity patients those who are able to pay for services.

The first obligation of any hospital is to render service to the sick. The superintendent of the University Hospital and those working with him desire to work with the physicians of the state to the end that good medical service may be rendered to all citizens. Efforts to prevent abuses are constantly made. But no system of financial inquiry is perfect. There are always border line cases on which honest difference of opinion exists. It is believed that better acquaintance and frank coöperation between the hospital and the profession will permit the hospital to be broadly useful and minimize conflict of interest between private and public medical agencies.

It is to be recalled that the University Hospital has a double function. It cares for patients and thus serves the state. It educates doctors and nurses, which also is a duty to the state. In a broad sense each generation of physicians trains the next generation. A comprehensive view of this matter on the part of the whole profession in the spirit of the Hippocratic oath—"To consider dear to me as my parents him who taught me this art, . . . to impart to my sons . . . and the disciples who have enrolled themselves . . . the precepts and the instruction"—will always contribute to harmonious action between the medical school and the profession itself. In this connection it is surprising to remark how many sons of our alumni and of the other doctors of the state are now enrolled in our classes.

HOSPITAL EXPANSION

During the year the plans for the Eustis Children's Pavilion, the Out-Patient Building, and the Students' Health Building have been completed. Construction will begin in July.

The support of these units is a matter of concern. The Eustis will be partially supported by endowment; the Students' Health Service will be supported by fees. So far as the rest is concerned the chief source of revenue must be the law covering county-state indigent patients. This law is excellent, but it is not yet in perfect operation. The state's half is supposed to be in the general university appropriation, but the exact amount has not been defined. The counties' half was appropriated at $100,000 for each year of the present biennium, but this is less than the counties will actually pay into the state treasury.

We favor the separation of both these items from the general university appropriations. This is justified on the ground that the hospital is a service enterprise, taking care of incapacitated, indigent citizens. The hospital should grow to the extent that the counties (which are the ultimate source of all the money) may desire to make use of its facilities. There is always a long waiting list which indicates such a desire on the part of counties. We think that separate appropriations should be made for the estimated amount of the counties' payments and for an equal amount to meet the state's half. Toward the latter we believe $100,000

per annum may be assumed to be already in the university appropriation. This should be segregated and given to the hospital by direct appropriation.

In addition to these special appropriations the hospital should receive a reasonable amount from university support on account of its educational functions. It is commonly agreed that the hospital can use its earnings from the smaller number of pay patients, Health Service patients, dispensary fees, etc. On the basis outlined the support and growth of the hospital can be assured.

THE MINNEAPOLIS GENERAL HOSPITAL

The plan for the removal of the Minneapolis General Hospital to the neighborhood of the campus and its establishment on land to be purchased by a gift from the General Education Board has been definitely abandoned. At the same time relations with the hospital have become increasingly intimate and cordial. The Welfare Board of the city takes a broad view of the relations of their institution to the education of doctors and nurses.

Mr. William F. Kunze of that board has proposed that the University take over the active management of the General Hospital at a nominal rental; that the University take care of the city's patients on a per diem basis; and that the University erect on the campus new hospital facilities as such may be needed to meet the growth of the city. In the course of years this plan would result in the concentration of the care of the poor of Minneapolis in the University Hospital on the same basis that the care of the poor of the state outside the large cities is accomplished. For the city the plan has the great advantage of avoiding a bond issue for a new hospital. For the University the plan envisages enlarged and controlled clinical facilities. It appears that this splendid ideal would appeal to philanthropic citizens, and that gradually the University would receive the necessary money for new units for its hospital just as the Elliott, Christian, Todd, and Eustis bequests have come in the past.

Mr. Kunze's plan has received a good deal of informal discussion. So far as known there are no formidable arguments against it. It is manifestly to the public interest both from the standpoint of the city and the state. It would contribute to the placing of the Medical School in the very front rank of such institutions. It is hoped it may be brought to conclusion in the coming year.

TUITION FEES

By vote of the Board of Regents Medical School fees have been raised from sixty dollars to seventy-five dollars per quarter. This is justified by the argument that prospective professional men should pay a larger share of the expense of their education. The increased receipts thus provided will strengthen the school in various places, an important one being obstetrics, in which we shall now be enabled to provide supervised teaching at the Ancker Hospital.

The reports of the superintendent of the University Hospital and the director of the School of Nursing are appended.

Respectfully submitted,
E. P. Lyon, *Dean.*

SCHOOL OF NURSING

The following report for the year July 1, 1927, to June 30, 1928, is submitted for the School of Nursing:

The statistical report for regular students is to be found in the registrar's report so is not given in detail here.

The report for students in the five-year course and for students affiliating from other schools of nursing in the state is as follows:

FIVE-YEAR COURSE IN ARTS AND NURSING

	1927	1928
In College of Science, Literature, and the Arts, and College of Education	38	48
In School of Nursing	32	44
Total registration in five-year course	70	92

Students receiving B.S. degree in combined course since June, 1927—10.

AFFILIATING STUDENTS (FROM OTHER SCHOOLS OF NURSING)

	1927	1928
Students in school on last report	80	75
New students since last report	42	53
Total registration	122	128
Students finishing course	42	67
Students cancelling	5	7
Present total	75	54

In order to make room for the regular students in the School of Nursing, the number of affiliating students to be admitted is steadily being reduced.

This year, for the first time, regular courses are being offered duruing the Summer Session in Administration in Schools of Nursing, and Ward Teaching and Supervision. Several outstanding people in the nursing field have been brought here to conduct these courses.

With the growth of the school, the need of a nurses' building is increasingly felt. The scattered housing of students at the University Hospital offers many problems and difficulties of administration, and the distance from the hospital is a real hardship for students, especially late at night and during the bad weather.

Respectfully submitted,
Barbara A. Thompson,
Acting Director.

UNIVERSITY HOSPITALS

Attached is statistical report for the year 1927-28. We had an increase of 8,383 days over last year. The per capita cost was cut about forty cents a day.

During the year we have finished the plans, and are ready to start the addition including the Eustis Hospital, Out-Patient Department, and University Health Service, providing a total, including previous facilities, of 440 beds. There is an increase in the demand for

beds in the hospital on the part of the counties, and there is no question but we will be able to make use of all beds, provided a sufficient appropriation is made under the county-state act.

Work in remodeling the service building is progressing and should be finished by fall. This provides a laundry to serve the whole campus, new kitchens, dining rooms, new children's ward, and will furnish additional hospital space when the internes move into the new building.

The report of the Nursing Department is included in the report of the School of Nursing. During the year the National Committee appointed to study nursing education made its first report. It is of especial interest to the university hospitals, and it seems that we should make a careful study of our central school in connection with the findings of this report.

I again wish to call attention to the need for a nurses' home and hope we will use every possible means to bring about the building of such a home during the coming year. It is very unsatisfactory to have the nurses scattered as they are and the cost is excessive.

We should also renew activity in order to bring about the building of a psychopathic department of our hospital which was authorized by the legislature four years ago. This would serve as an admission unit to the various state hospitals and would add much needed teaching facilities for the Medical School.

We have arranged with the Home Economics Department to send their students to the University Hospital for training in dietetics. We are also paying part of the salary for a special worker in connection with the Department of Sociology to teach medical social work, and steps are being taken to bring about a more satisfactory arrangement between the Dental School and the Dental Department of the hospital.

The *X*-Ray Department is doing splendid work under the direction of Dr. Rigler. Dr. Stenstrom is making important studies in connection with *x*-ray, radium, and physical therapy. Foundations should be encouraged to provide an endowment fund for the Cancer Institute. Our physical plant makes it possible for us to take a very important part in the study of cancer, but we are handicapped for lack of funds.

The Out-Patient Department is carrying on very satisfactory work. The number of admissions has been slightly cut because of the careful investigation of applicants. We are endeavoring to carry on the work of the hospital in a way which is absolutely fair to the medical profession. The new Out-Patient Department should mean a great deal to the Medical School, as the most important training is given in connection with ambulatory patients.

During the year the superintendent has visited many counties of the state in order to become acquainted with the medical profession. It is his purpose to visit all counties.

I wish to thank the heads of departments, employees, as well as the administration of the Medical School and University, for help and coöperation during the past year.

Respectfully submitted,
PAUL H. FESLER, *Superintendent.*

EARLY DIAGNOSIS OF TUBERCULOSIS CAMPAIGN

Two one-day post-graduate courses will be held as a part of the Christmas Seal "Early Diagnosis" campaign of the Minnesota Public Health Association. The Minnesota State Medical Association and the institutions at which the courses are to be held are coöperating. Applications for these courses, which are to be limited to twenty-five physicians, may be made to the Minnesota Public Health Association, 11 West Summit Ave., St. Paul.

The first course will be conducted at the Lymanhurst Hospital School, Minneapolis, April 11, by members of the medical staff and will be devoted to "Childhood Tuberculosis." The tentative program follows:

Purpose and Program of Lymanhurst, Dr. F. E. Harrington, Health Commissioner, Minneapolis;

Result, Dr. L. F. Richdorf, assistant professor of pediatrics, University of Minnesota;

Diagnostic Steps, Dr. C. A. Stewart, assistant professor of pediatrics, University of Minnesota;

X-ray Findings, Dr. Malcolm B. Hansen;

Bone and Joint Tuberculosis, Dr. Paul W. Geisler;

Treatment, Dr. J. A. Myers, associate professor of preventive medicine, University of Minnesota.

Clinical demonstrations will be given throughout the afternoon by members of the Lymanhurst staff. Closing the course will be the annual Lymanhurst banquet. Speakers include two outstanding authorities on tuberculosis: Dr. Henry Boswell, medical director, Mississippi State Sanatorium, and Dr. Ralph C. Matson, medical director, Portland Open Air Sanatorium, Milwaukee, Ore.

The State Sanatorium at Ah Gwah Ching has been selected for the second course, to be held May 2. All forms of tuberculosis will be discussed at this course, which will include examination of cases and demonstration of pneumothorax treatment. In addition to Dr. H. A. Burns, superintendent of the state sanatorium, and his medical staff, the following have been invited to take part in the program: Drs. J. A. Myers, associate professor of preventive medicine, University of Minnesota; F. F. Callahan, Pokegama Sanatorium; C. B. Wright, Minneapolis, past-president, Minnesota State Medical Association; R. L. Laney, superintendent, Lake Julia Sanatorium, Puposky; J. A. Thabes, Brainerd; and L. A. Rigler, Minneapolis.

Arrangements are now under way for a short course to be held April 20 at the Tuberculosis Pavilion of Ancker Hospital, Saint Paul. The course will be under the direction of Dr. Everett K. Geer.

REGISTRY OF TECHNICIANS OF THE AMERICAN SOCIETY OF CLINICAL PATHOLOGISTS

In accordance with the trend of the times, the practice of medicine is utilizing more and more the services of trained lay help. The advent of the laboratory as an indispensable aid in the diagnosis of disease has created a new specialty in medicine—that of clinical

pathology. In order to carry on the numerous technical tests required in scientific diagnostic procedures, the laboratory director has found it necessary to train the technical personnel. With the standardization of hospitals and the urgent call for qualified laboratory assistants there has arisen a demand for proper standardization of the preliminary education and technical training of those enrolled in this new profession.

There has also been a desire on the part of those engaged in this useful calling to raise their status, similar to the evolution of the trained nurse of a generation ago. This want is now being taken care of by a national organization consisting of a body of men who are most vitally interested in elevating the intellectual and technical status of laboratory workers. The American Society of Clinical Pathologists has taken upon itself the task of organizing a Registry of Technicians with rules under which those qualified by education, technical instruction, and moral character will receive a certificate.

The subject is of interest to physicians in every field of endeavor, as many of them are desirous of securing the services of technicians to carry on the routine laboratory procedures.

There is no doubt that the elevation of the laboratory technician to the status of a respected and useful calling will be a great help to the medical profession, to the patient, and to the scientific practice of medicine.

The headquarters of the Registry of Technicians of the American Society of Clinical Pathologists are located in the Metropolitan Building of Denver, Colorado.

Another very desirable feature of the Registry is the facilities it offers in finding suitable placement for registrants and in aiding physicians to find desirable applicants.

ANNOUNCEMENT EXTRAORDINARY

It is with the greatest pleasure that your committee on Education of the State Medical Association announces the inauguration of THE CONSULTATION BUREAU for the members of this Association.

Pursuing the policy that the State Association should do all in its power to promote the highest standards of medical practice among its members, we have organized and placed at your disposal the facilities and resources of a consultation service, with headquarters in the Saint Paul office of the State Association.

For the time being the Bureau will be conducted under the general supervision of a sub-committee of the Committee on Medical Education, composed of N. O. Pearce, Minneapolis; E. H. Hammes, Saint Paul; F. J. Hirschboeck, Duluth, and G. E. Brown, Rochester, with Wm. A. O'Brien, Assistant Professor in Pathology, well known medical authority, as director in charge.

The function of this Bureau is to furnish the members of this Association with prompt and confidential information on any subject relating to the practice of medicine. The resources of a staff of the most competent consultants in every line of medical endeavor will assist Dr. O'Brien in obtaining for you the information desired. No question is too trivial and no problem too large for you to submit to this Bureau for an opinion.

This enterprise of the State Association will furnish its members an unexcelled opportunity for a private and confidential informal consultation on problem cases. The director and his secretary will be the only persons to know the identity of the physician making consultation request. Prompt reply will be the keynote of this service and there will be no charge.

Telephone or telegram consultations, while ordinarily unsatisfactory, will be accepted in emergency cases, all such expense to be borne by the requesting physician.

A Question and Answer Column in MINNESOTA MEDICINE will be conducted by this Bureau. Watch this space for interesting bits of information and case analysis.

Address all communications to Consultation Bureau, Minnesota State Medical Association, 11 Summit Ave., St. Paul, Minn.

N. O. PEARCE,
Chairman, Committee on
Medical Education.

A NEW WAY OF TYING THE UMBILICAL CORD

Thick umbilical cords sometimes shrink with bleeding that is alarming, sometimes fatal. Sepsis sometimes develops even though the physician has taken great pains to prevent it.

Nature accomplishes healing without infection, under the most unfavorable conditions by quick drying. Methods which accomplish quick drying work out the best.

The following method of tying the cord with a rubber binder accomplishes quick drying and is as sure a method of preventing bleeding as can be devised.

1. Tie a string at each end of a small rubber binder.
2. Clamp one end of the rubber binder on to the umbilical cord with an artery forceps, stretch the binder and wind it around the umbilical cord as near to the skin as possible.
3. Tie with the string, taking a turn or two with the string to make all secure.
4. Cut the cord close to the tie.
5. Pack around with sterile gauze to absorb moisture.

The above, of course, includes the usual methods of asepsis and disinfection.

This method is simple, inexpensive, can be applied quickly and gives good results.

C. G. KELSEY, M.D.,
Hinckley, Minnesota.

OBITUARY

Chauncey J. V. Pettibone
1884-1929

Chauncey J. V. Pettibone, assistant professor and head of the department of physiological chemistry at the University of Minnesota Medical School, committed suicide at his apartment, March 7, 1929.

Mr. Pettibone was born in Fond du Lac, Wisconsin, October 19, 1884. He graduated from the University of Chicago in 1907, studied in Berlin and from 1909 to 1911 did postgraduate work at Harvard, where he received his Ph.D. degree. The following year he studied at Halle, Germany.

Mr. Pettibone came to the Medical School in 1912 and in addition to instructing in physiological chemistry he has been adviser to students about to enter the medical school, assisting them to select their courses.

A letter which had been written by Mr. Pettibone to Dean Lyon of the Medical School led to the discovery by the Dean of the suicide. The note stated that Mr. Pettibone had been in ill health and unable to sleep. He was found seated on a stool in front of the gas range, with his head in the oven and the jets open. A rug had been draped in front of the oven door and over his head, evidently to confine the gas to the oven.

David Albert Locke
1855-1929

Dr. D. A. Locke, Minneapolis physician for 45 years, died at his home Feb. 20, 1929, at the age of 74. Dr. Locke graduated from the University of Minnesota in 1881 and from the Hahnemann Medical College of Chicago in 1884.

His was a familiar figure in that district of Minneapolis. He was of the old type of family physician and was known far and wide in his community. He was one of the first men in Minneapolis to own an automobile and many a Minneapolis citizen of today still recalls with delight the rides he had as a boy with Dr. Locke.

Dr. Locke came to Minnesota with his parents in 1865 and settled on a farm at Lake Minnetonka, near Groveland, which his father had purchased in 1854.

He is survived by three brothers, Cassius M. Locke of Minneapolis, S. A. Locke of Los Angeles and the Rev. William H. Locke of Geneva, Ill.

Charles F. Nootnagle
1864-1929

Dr. Charles F. Nootnagle, prominent Minneapolis physician and surgeon, died suddenly of heart disease Thursday, Feb. 28, 1929, on his sixty-fifth birthday.

Dr. Nootnagle had practised medicine in Minneapolis for 39 years and had built up an extensive practice. His death was entirely unexpected, as it was preceded by no apparent illness, and came while he was seated in a chair at his home. He died within a few minutes of the heart attack.

Dr. Nootnagle was a graduate of the University of Minnesota and the Physicians and Surgeons College, New York city. After completing his courses at the latter institution he went abroad to study at Berlin, Germany, and Vienna, Austria-Hungary. Upon his return to America he practised medicine at Evansville, Minnesota, then moved to Minneapolis.

Surviving him are his wife; a daughter, Mrs. H. W. Spink, of Kansas City; a son, Philip Nootnagle, of Florida, two brothers, Herman, of Sisters, Oregon, and Fred, of Tyler, Minn., and a sister, Mrs. Gustav Kaphan, of Tacoma, Wash.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Public Health

"In public health the discoveries of science have opened a new era. Many sections of our country and many groups of our citizens suffer from diseases the eradication of which is a mere matter of administration and moderate expenditure. Public health service should be as fully organized and as universally incorporated into our governmental system as is public education. The returns are a thousandfold in economic benefits and infinitely more in reduction of suffering and promotion of human happiness."

HERBERT HOOVER, President of the United States.

The United States has a president who gives some space in his inaugural address to the question of Public Health of his Country. We are curious to know what the President's idea of the "limits" of public health might be. There is such a vast difference of opinion as to what comprises public health and what comprises the practice of medicine. The Minnesota State Medical Association is fortunate in having progressive state officers. The state officers have recognized that the "limits" of public health and the practice of medicine vary a great deal in the minds of many of the public.

The function of the Committee on Public Health Education is to study the attitude of the public as to the practice of medicine, and to keep the profession and the public informed as to what comprises the practice of medicine in the best judgment of the medical profession.

The Committee on State Health Relations was created because of the increasing scope of state medicine. State medicine is here and undoubtedly is necessary to a certain degree. The question for the doctors of the State Medical Association to study is to what degree is state medicine advisable and then to help guide legislation and public opinion along the lines determined upon.

The following is a partial list of tax supported Minnesota Institutions under the Board of Control:

Anoka State Asylum
Hastings State Asylum
Willmar State Asylum
Fergus Falls State Hospital
Rochester State Hospital
St. Peter State Hospital
School for the Feeble Minded
Colony for the Epileptics
School for the Blind
School for the Deaf
Minnesota Sanatorium for Consumptives
Gillette State Hospital for Crippled Children
Buena Vista Sanatorium
Deerwood Sanatorium
Fair Oaks Lodge Sanatorium
Glen Lake Sanatorium
Lake Julia Sanatorium
Mineral Springs Sanatorium
Nopeming Sanatorium
Oakland Park Sanatorium
Otter Tail County Sanatorium
Ramsey County Tuberculosis Pavilion
Riverside Sanatorium
Sand Beach Sanatorium
Southwestern Minnesota Sanatorium
Sunnyrest Sanatorium

The above list, you will note, does not include the University Hospital, or such county and city tax supported institutions as the Ancker and the General Hospitals.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION

The Committee on Scientific Assembly for the sixty-first annual meeting of the Minnesota State Medical Association which will be held in Saint Paul, May 13, 14 and 15 completed the program at its meeting on Saturday, March 9.

Monday morning will be given over to an intensive clinical program to be put on by the members of the Ramsey County Medical Society; Monday afternoon to a program on fractures by the Minnesota Orthopedic Club. Monday evening the members and their families are invited to listen to a discussion on "The Cost of the Medical Care" by O. E. Locken, Crookston; Michael Davis, Rosenwald Fund, Chicago; and Morris Fishbein, American Medical Association.

Tuesday and Wednesday, commencing at 9:30 a. m., an interesting scientific program has been arranged. Symposiums on Diabetes, Heart, Goiter and Urology will be featured. The moving pictures: Diagnosis and Treatment of Infections of the Hand by Allen B. Kanavel, The Cinematograph Demonstration of Living Tissue Cells Growing in Vitro by Canti, and the Davis Obstetrics film will be shown.

All the above meetings will be held at the Masonic Temple and lunch will be provided at a moderate price. On Tuesday evening the annual banquet will be held at the Saint Paul Hotel. The House of Delegates will meet on Monday afternoon, and on Tuesday noon they will install officers.

Indications are that this is to be the best and most interesting program that the Minnesota State Medical Association has ever had.

ANNUAL CONFFERENCE OF SECRETARIES

A record attendance and a program of unusual interest is reported for the annual conference of secretaries of component societies of the Minnesota State Medical Association held in Saint Paul, February 23. Fifty-seven physicians, representing twenty-four societies, registered for the meeting, and this number was supplemented by many Twin City physicians at the dinner and luncheon sessions. Six states were represented at the Northwestern Regional conference which was held in conjunction with the state meeting.

Legislation and publicity were the major topics of discussion at the one-day conference of secretaries. That physicians should be represented on committees and take an active part in planning and directing activities of local organizations was stressed in a discussion of "Lay Health Organizations" by Drs. C. G. Kelsey, Hinckley, and J. P. McDowell, St. Cloud, at the opening session, at which Dr. E. A. Meyerding, state secretary, presided.

Newspaper publicity, from the standpoint of the doctor, the editor and the public, formed the theme of a number of talks during the morning and at the noonday luncheon.

Health information is now demanded by the public, who will seek and get it wherever possible. If the physician, who is the logical leader because of the valuable scientific knowledge he possesses, does not assume responsibility in public health education, others will. This was the consensus of a group of physicians and newspaper editors who discussed the various phases of public health education and publicity. Among the speakers were: Drs. George Earl, chairman of the health education committee of the Minnesota State Medical Association; Theo. Satersmoen, Pelican Rapids; W. F. Wilson, Lake City; and Arnold Daane, managing editor of the Austin Daily Herald, and H. F. Hotaling, secretary, National Editorial Association.

That the press is the greatest single factor in moulding of public opinion and that publicity is a recognized factor with any organization that is making progress today was stated by Dr. Earl. The weekly news service of the state association is now being sent on request to 240 papers in Minnesota, Dr. Earl said, and the majority of the papers use the articles regularly in good space in the papers.

In a discussion of the use of the names of physicians in publicity, Dr. Earl pointed out that there is a great variety of opinion with a general tendency towards the use of names, but that Minnesota is still conservative in this respect. Newspapers are not in a position to eliminate names of individual physicians from their columns, according to Arnold Daane of the Austin Herald, for two reasons: In the first place, it is necessary for the papers to place responsibility for statements that are made, and in the second place, without names a news story loses its interest and personality.

Dangers in general use of medical publicity were brought out in a talk by Dr. Herbert M. Fisch, Austin, and discussion by Dr. W. C. Woodward of the American Medical Association, Chicago. Among the dangers mentioned by the speakers were: It gives undue publicity to one practitioner; it gives the charlatan a chance to sell his wares; it gives the physician who may be skilled in the ways of publicity an unfair advantage over other doctors, who may be better equipped scientifically, but know nothing of publicity methods.

In a symposium on "Is the Physician Entering Cooperative Medicine," advantages and disadvantages of clinics, the economy in coöperative buying and the value of a physicians' service bureau in collections and credit ratings were described. Those taking part were: Drs. D. D. Hilger, St. Paul; L. J. Holmberg, Canby; Edgar T. Herrmann, St. Paul, and H. F. Whittle, Minneapolis.

Coöperation of the secretaries in fighting unfavorable legislation was asked by Dr. H. M. Johnson of Dawson. The three outstanding bills of interest of the medical profession are the hospital, naturopathic and compensation, Dr. Johnson said.

At the luncheon meeting, at which Dr. J. T. Christison, president of the Minnesota State Medical Association, presided, Mrs. Ben. F. Davis, Duluth, auxiliary president, told of the aims and achievements of her organization.

Confidence in the ultimate success of the basic science law in protecting the public was voiced by F.

Manley Brist, Saint Paul, investigating attorney, Minnesota State Board of Medical Examiners.

"The basic science law is one of the finest pieces of medical legislation ever listed on the books of Minnesota," Mr. Brist said. "It will in the long run do more in preventing the public from being swindled out of money than any other law."

Public opinion is the chief objection to the enforcement of the law, Mr. Brist pointed out, and he urged more general education on the methods of quackery.

Plans for a statewide diphtheria immunization campaign were outlined by Dr. C. B. Wright of Minneapolis, and Dr. F. W. Schlutz of the University of Minnesota. Demonstrations of proper use of toxin antitoxin to physicians and a general public educational campaign urging parents to take their children to the family physician for immunization are included in the plans.

"The ideal age for inoculation is before the age of one year," Dr. Schlutz said. "Parents should be instructed right after the birth of the child to bring him back for this protection during the first year. The highest death rate is between the ages of one and five."

Assistance to doctors who are isolated, through a Consulting Bureau for Physicians, was proposed by Dr. N. O. Pearce, Minneapolis. Action to start this work at once was taken at the State Council Meeting. Progress of post-graduate medical work was described by R. R. Price of the Extension Division, University of Minnesota.

Joint dinner meetings of the auxiliaries with the medical societies serve to increase attendance at medical meetings, it was explained in the symposium on "How to Make a Medical Meeting Interesting." Among those taking part were: Dr. C. L. Scofield, Benson; G. I. Badeaux, Brainerd; C. J. Plonske, Fairbault; and H. C. Cooney, Princeton.

AMERICAN COLLEGE OF PHYSICIANS

The American College of Physicians will hold its Thirteenth Annual Clinical Session in Boston, April 8-12. Dr. Charles F. Martin, Dean of the Faculty of Medicine, McGill University, is President of the College this year, and Dr. John H. Musser, Professor of Medicine at Tulane University Medical School, is President-Elect and will be inducted to the Presidency toward the end of the Boston meeting. Dr. James H. Means, Jackson Professor of Clinical Medicine at Harvard Medical School and Chief of the Medical Service at the Massachusetts General Hospital, is General Chairman of all Boston Committees having charge of arrangements for the Clinical Session of the College in April.

The program provides hospital visits, clinics, demonstrations and ward-walks during the forenoons at fifteen different Boston hospitals, and for general scientific sessions each afternoon and evening in the Assembly Room of the Hotel Statler, which will be headquarters. Eminent authorities in their special lines will present the results of their work before an audience competent to appreciate the value of the contributions.

The annual banquet of the College will be held Thursday evening, April 11, when Dr. George E. Vincent, President of the Rockefeller Foundation, will deliver the chief address. The Convocation, for the conferring of Fellowships, will take place Friday evening, April 12. Dr. Charles F. Martin, of Montreal, will deliver the Presidential Address.

Programs and details concerning reduced fares, admission, etc., may be secured from the Executive Secretary, E. R. Loveland, 133-135 S. 36th Street, Philadelphia, Pa.

AMERICAN PROCTOLOGIC SOCIETY

Detroit, May 13, 14 and 15, 1929

The American Proctologic Society will hold its annual meeting in Detroit—"The Convention City"—on May 13, 14, and 15. The Hotel Statler has been selected as headquarters for the scientific program, and the scientific and commercial exhibits.

Any Doctor of Medicine who graduated from a recognized medical school and who is a member in good standing of his county and state societies, and the A. M. A., and who is especially interested in proctology shall be eligible for election as an Associate Member of the American Proctologic Society.

Applicants for Fellowship in this society must have limited their practice for at least seven years, and except under unusual circumstances applicants will not be considered who are not members of good standing in the American College of Surgeons. Men who have limited their practice to proctology for less than seven years are eligible as associate members without this restriction.

The following is the list of officers: Edward G. Martin, M.D., President, 1447 David Whitney Building, Detroit, Michigan; Arthur H. Earley, M.D., Vice-President, Denver, Colorado; Walter A. Dansler, M.D., Secretary-Treasurer, 531 LaSalle Building, Minneapolis, Minnesota.

Any reputable medical man will be welcomed as a guest at this meeting: registration fee, $5.00.

LYMANHURST ANNUAL STAFF DINNER AND OPEN BANQUET

Lymanhurst, of Minneapolis, commonly known as the school and clinic for tuberculous children, is under the jurisdiction of the Minneapolis Board of Public Welfare. It is directed by the Commissioner of Health, Dr. Francis E. Harrington, and maintains an executive, research, clinical, visiting and honorary staff.

It announces itself as a municipal institution and available in the service of the city's tuberculous children.

It is seeking closer affiliations, for practical working purposes, with the various official and voluntary health agencies. In order to emphasize its desire for these better mutual relations, it proposes to convert its annual clinical staff dinner into an open banquet, at which

representatives of all these organizations and the friends of Lymanhurst at large will be welcome.

Plans for fuller interchange of health service will be presented at the Banquet, and addresses will be given by Dr. Henry Boswell of the Mississippi Sanatorium, upon "The Importance of Early Diagnosis of Tuberculosis," and by Dr. Ralph Matson of the Portland, Oregon, Sanatorium, upon "The Surgery of the Chest."

The banquet will be held at the New Nicollet Hotel on the evening of April 11, 1929, at six-thirty o'clock. During the morning and afternoon of that day conference and clinical programs will be conducted at Lymanhurst.

Reservations for the Banquet should be requested of Dr. R. O. Beard, Telephone Main 5275, 324 Citizens' Aid Building, and checks may be mailed to him.

INTER-STATE POST GRADUATE MEDICAL ASSOCIATION

The spring tour of the Inter-State Post Graduate Medical Association will take place between April 15 and May 9, 1929, starting at Rochester, Minnesota, where the first two days will be spent. Three days will be spent in Chicago, then Cleveland, Boston, New Haven, New York, Philadelphia and Baltimore will be included before the final clinics in Washington. The estimated cost for each passenger is $525.00.

The 1929 Foreign Assembly of the Association will take place between the dates, May 25 and July 18. England, Scotland, Norway, Sweden, Denmark, Hamburg, Frankfort and Paris will be included in the itinerary. The cost of the tour for each individual is placed at $1,150.00.

For further information, write Dr. W. B. Peck, Managing Director, Freeport, Illinois.

MINNEAPOLIS SURGICAL SOCIETY

Dr. S. R. Maxeiner was elected president of the Minneapolis Surgical Society to succeed Dr. Stephen H. Baxter, at the annual meeting held March 3. Dr. M. J. Lynch was elected vice president; Dr. H. O. McPheeters, secretary-treasurer; and Dr. Theodore H. Sweetser, retiring secretary, member of the council. The newly elected officers will assume office in September. About 35 surgeons attended the meeting.

The scientific program included the following:

"Three cases of syphilis of the stomach," Doctors J. M. Hayes, J. A. Johnson, and S. R. Maxeiner.

"Case of fracture of the neck of the femur in a woman 93 years old, treated by cotton impaction and a Whitman cast," Dr. R. C. Webb.

"Impressions of some European surgical clinics," Dr. Ivar Sivertsen.

"The acute perforation of the duodenal ulcer," Dr. F. A. Olson.

OF GENERAL INTEREST

The amendment to the Workmen's Compensation Bill S. F. 301 was killed in Committee, February 26.

Edwin L. Wanous, son of Dr. and Mrs. Edwin F. Wanous of Minneapolis, died February 15. He was 18 years old.

The two-year-old son of Dr. and Mrs. H. M. Juergens of Belle Plaine died in January of pneumonia and complications.

Dr. A. S. Hamilton, Minneapolis, was appointed a member of the Editing and Publishing Committee for a term of two years.

Dr. Myron O. Henry of Minneapolis has returned from visits to southern clinics, where he spent the two months of February and March.

Dr. J. P. Schneider of Minneapolis has severed his connections with the Nicollet Clinic and is retiring from active practice on account of ill health.

Mrs. L. B. Baldwin, widow of Dr. Baldwin, formerly superintendent of the University Hospital, Minneapolis, died in Duluth the morning of March 18 of apoplexy.

Members of state executive committees of the American College of Surgeons elected at the business session of the northwest section of the organization held in Minneapolis March 11 included the following:

Dr. Wallace H. Cole of St. Paul was named chairman of the Minnesota division while Dr. J. M. Hayes of Minneapolis was elected secretary. Dr. O. J. Hagen of Moorhead was elected Counsellor for Minnesota.

Word has been received of the death of Mrs. Katherine Cornelie Granger, wife of Dr. Charles T. Granger of McGregor, formerly of Rochester. Mrs. Granger before her marriage some thirty years ago was head nurse at the Northwestern Hospital in Minneapolis.

At a recent meeting of the Council, the resignation of Dr. Earle Hare as treasurer of the Minnesota State Medical Association was accepted. Dr. A. G. Schulze, secretary of the Ramsey County Medical Society, was elected to fill the vacancy caused by Dr. Hare's resignation.

The Minnesota Society of Internal Medicine is offering a prize of $250.00 for the third consecutive year to the practising physician, exclusive of members of the society, in Minnesota who has been deemed most worthy to receive a prize in research in clinical medicine. Inquiries should be addressed to Dr. E. L. Gardner, Secretary, 610 Yeates Building, Minneapolis.

The Eitel Hospital in Minneapolis has been purchased by the Nicollet Clinic and plans are being made to add the three stories originally contemplated by the founder, the late Dr. Eitel. The hospital was founded in 1912

and the first unit completed two years later at a cost of $250,000. A second unit, known as the Loring Medical building, was added in 1925 at an approximate cost of $150,000.

For North Dakota, Dr. Murdock MacGregor of Fargo was elected to the position of chairman and Dr. Archie D. McCannel of Minot was named secretary. Dr. Henry H. Healy, Grand Forks, will be the new counsellor. Dr. Frederick Teron, Chamberlain, S. D., was elected chairman of the South Dakota division, and Dr. F. Daniel Gillis of Mitchell, secretary. Dr. Jesse D. Whiteside of Aberdeen was named counselor.

Professor Clemens von Pirquet is reputed to have committed suicide with his wife on February 28. Mrs. Pirquet's ill health and financial troubles are supposed to have been the causes of the tragedy. Professor von Pirquet had been director of the pediatric clinic in Vienna for a number of years. He was professor of pediatrics at Johns Hopkins for two years before the war. During the war he developed the "nem" system for feeding children, using the sitting height-weight ratio to determine the required calories.

Dr. von Pirquet came to the University of Minnesota in 1923 to head the department of pediatrics but stayed just two weeks. The reasons for his brief stay were never satisfactorily explained but homesickness was mentioned.

Dr. von Pirquet will be remembered by the cutaneous tuberculin test which bears his name.

TYPHOID CARRIER RECORD IN NEW YORK

During the year 1928, 20 newly discovered typhoid carriers and 3 carriers from other states or from New York City were added to the Health Department's list in upstate New York, exclusive of those in State institutions. The total number of carriers on record at the end of 1928 was as follows:

Upstate (exclusive of State institutions)	167
State institutions	31

The investigations which led to the discovery of the 20 carriers were made by:

Local health officer or health department, 9; State Department of Health, 3; State Department of Health and local health officer, 3; attending physician, 3; routine examinations of food handlers in manufacturing plants, 2.

Forty-eight cases of typhoid fever occurring during the year were traced to the 20 newly discovered carriers. Four of these were male and 16 female. In all but 2 there was a history of a previous attack of typhoid fever—in one instance the attack having occured 37 years before the discovery of the carrier condition. One had a questionable attack of typhoid fever 51 years ago and a definite attack about one year previous to discovery. Their ages ranged from 15 to 68 years. During the year gall-bladder operations were performed on 7 carriers (including one in a state institution), 4 being released from restrictions following such operations, after a series of laboratory specimens had indicated that they were no longer carriers.—*Health News,* March 18, 1929.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of February 13, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 13, 1929. Dinner was served at 7 p. m. There were 43 members present.

Owing to the very lengthy program and considerable business to come before the Academy, the President, Dr. C. N. McCloud, called the meeting to order at 7 p. m. and presented each member with a ballot for preliminary voting.

After dinner the members re-assembled and the minutes of the January meeting were read and approved.

The scientific program of the evening consisted of the following papers and case reports:

Dr. W. A. Coventry (Duluth) gave a paper entitled "Spinal Anesthesia: report of personal experiences."

DISCUSSION

Dr. Franklin R. Wright (Minneapolis): I spent the summer of 1902 in the clinic of Professor Zuckerkandl in Vienna. Between that time and 1911 I used spinal anesthesia about 100 times. Since learning to use H. M. C. tablets I no longer use it.

Technic: You should have a needle which is sharp in the edge, but fairly blunt. It should be inserted so that the bevel of the needle is lengthwise with the body of the patient. The fibres of the dura lining the spinal canal run lengthwise of the body. The needle should be inserted so that the bevel of the needle will separate the fibres of the dura instead of cutting them. This will require less pressure and produce less shock. The needle should not be inserted too deeply, just enough to pierce the dura. The bulk of the spinal fluid lies between the dura and the pia. If the needle is inserted deeply enough to pierce the pia only a small amount of fluid can be obtained and on re-injection only a very limited area is anesthetized.

In the early use of spinal anesthesia we were bothered with secondary hemorrhage; that is, oozing from the wound. We learned whenever muscular tissue appears blanched to give the patient promptly a full dose of strychnin. After adopting that we had no further trouble of this kind.

In our hundred cases we had trouble with two. In one case the patient was placed in a high Trendelenburg position. We had interference with the respiration and had to use artificial respiration for about thirty minutes. In another case, at the suggestion of my friend Dr. Farr, I used novocaine as an anesthetic. One grain was given. The patient died of novocaine poisoning. I always used tropicaine, except in this one case.

Dr. E. S. Judd (Rochester): Dr. Coventry's paper is very timely. Spinal anesthesia has come into more common use in the past year or two and we feel safer in employing it since we began giving ephedrin. Here-

tofore, we had drugs that would raise the lowered blood pressure following the use of novocaine in spinal anesthesia, but not until ephedrin was employed did we have a drug that would not only raise the blood pressure but would keep it elevated for some time.

In the past fourteen months we have used spinal anesthesia over 500 times, and we have not had a death result from the anesthetic. There have been some rather alarming and sudden changes and in one or two instances the reaction from the spinal anesthetic was so severe that it may have been a factor in the ultimate death of the patient. In not a single instance did death immediately follow the anesthetic nor could we say that it was responsible for the outcome. However, after spinal anesthesia the blood pressure should be estimated frequently and ephedrin should be used to overcome the effect of the novocain. Spinal anesthesia is now being used so generally by surgeons formerly much opposed to it that there can be no question but that in time it is to be one of the most satisfactory ones employed.

There are two great advantages in the use of a spinal anesthetic: (1) It minimizes the chances for pulmonary complications; and (2) it produces the most complete relaxation of the muscles and does away with oozing and bleeding, thus making an ideal operative field.

Dr. Coventry (in closing): Dr. Wright spoke of the kind of needle. Sise of the Tobey Clinic has invented a needle beveled on four sides. We have found sometimes that our fluid did not come out freely and have twisted the needle around. I think Dr. Wright's suggestion of having the bevel of the needle up and down, lengthwise of the body, is a suggestion well worth trying. So far as oozing from the wound is concerned, we have not had any trouble from post-operative hemorrhage. There is a decrease in the flow of blood due to lower blood pressure. Our impression from the use of ephedrin was that giving the second dose does not have the same effect as the first dose; and giving it just before the anesthetic would tend to keep the blood pressure sustained. We had one case with a blood pressure of 210 which came down to 140 and the patient never "batted an eye." We did, but the patient was all right.

Dr. A. N. Collins (Duluth) read a paper on "Fractures of the Knee Joint." This was illustrated with numerous lantern slides.

DISCUSSION

Dr. M. S. Henderson (Rochester): This group of cases is very interesting and I think Dr. Collins has shown us something worth while. When we stop to consider the kind of tissue through which the fracture extends, we can readily understand why in many cases operative interference does not effect the good result we might expect. This is because if the direct force is severe enough to actually crush, to any great extent, the spongy bone, it cannot be restored. All these cases shown by Dr. Collins involved only one bone—the tibia—and that is the reason why conservative treatment gives such good results, for there is left one normal articular weight-bearing surface. When both bones are involved, surgical interference is more often necessary. In these cases with the fracture only in the head of the tibia, good function is not incompatible with poor anatomical restitution, as Dr. Collins has shown. Early institution of motion is essential, and delay means adhesions that will be the cause of permanent disability beyond what there should be.

Dr. Emil S. Geist (Minneapolis): I also appreciate Dr. Collins' able presentation. In some of these fractures, I do not feel as optimistic as Dr. Henderson does. I believe some of these cases need open operation. The orthopedic surgeon, of course, sees most of this type of knee injury a year or two after the accident has occurred.

When there is bad displacement of one of the tuberosities of the tibia, one must think of replacing it, as accurately as possible, to its normal position. If this is not done, disability and deformity will ensue. Dr. Collins' case of the dancing master presents excellent functional results in spite of much bony displacement and deformity, but it is an exceptional case. Not all similar cases get an equally fortunate result. In about half a dozen fresh cases, I had the temerity to operate and to replace the fragments so that the articular joint line of the upper end of the tibia was brought to normal. In these cases, I am sure that I achieved better results for the patient than if I had adopted a simple laissez-faire policy. In other words, I believe that when there exists a great amount of downward displacement and impaction of a tibial tuberosity, we are justified in opening, reducing the impaction and bringing the broken-off fragment to its normal joint alignment.

Dr. A. R. Colvin (St. Paul): A fracture into a joint such as those described by Dr. Collins is usually accompanied by a good deal of hemorrhage into the joint and we have been accustomed to aspirate under these conditions.

In periarticular fractures, the reaction of the tissues around the joint is a very variable one; a very slight injury may result in a great deal of stiffness which lasts a long time and any attempt at mobilization seems to make it worse. This individual reaction of tissues is nearly as variable after trauma as it is after infection. One person with a non-suppurating infection may have a very stiff joint and another with a suppurating joint may have very little stiffness.

In fractures at the knee joint without much displacement and no tendency to displacement, I am inclined to do very little immobilization, but confine the patients to bed and let them move their joints as soon as possible. Non-operative reduction of these fractures is not very successful. Operative correction is not often necessary.

Dr. W. A. Coventry (Duluth): I just want to say that the first case Dr. Collins showed was reduced under spinal anesthesia and one could not ask for any more relaxation than we had in that case. It was a great help to the surgeon.

Dr. A. T. Mann (Minneapolis): I think about ten years ago we used to operate on more of these fracture cases of the knee than we do now, but I still think there are some well-selected ones in which we may do some remarkable work. I recall a rather unusual case I had of a girl about thirteen years old who was run over by a motorcycle. She had a fracture of the ankle, a crushing of the leg, a compound fracture of the pelvis, and a T-fracture into the knee joint of the lower end of the femur with both condyles loose and split apart. In that case I did an open operation on her to fasten one of the condyles to the shaft. The external condyle I fastened with a Lane's plate. While I was working on the inside the internal condyle came out in my hand. I thought if I was going to do anything I would like to insert a bone-graft; and then I thought I could have no better bone-graft than the piece I had in my hand because it belonged to her and it would fit into place perfectly. It had been squeezed out like an orange out of its skin so that the cartilage was still in the joint. I put that condyle back into place and sewed the soft parts around it so that it was fairly snug. She had been bruised so much that she got a necrosis of some of the toes, the crushed leg below the knee was infected and became a bag of pus, and we had a great deal of pus oozing from my incision over the internal condyle. I thought I had lost everything, but my Lane's plate was still in place. To make it short, the thing all cleared up. That was fourteen years ago and the young woman was in my office just a few days ago. The Lane's plate was healed into place, the auto-graft of the internal condyle was firm and the external condyle was firm. She has a good knee joint. She has within 5 degrees or so of complete flexion, and she has normal extension. Which shows that sometimes we get results we do not expect.

Dr. A. W. Ide (St. Paul): The important point in this matter is to make sure that the articular surface of the tibia is level. This recalls to my mind a case that Dr. Geist saw with us. He may recall the patient. This case had been operated upon elsewhere. The result was excellent except in this one fundamental respect: the articular surface was not level. The weight was thrown out of alignment and the result was not good.

I feel that there are two important things to be borne in mind in treating these cases: (1) to secure a level articular surface and (2) to mobilize them early.

Dr. Collins (in closing): These cases were purposely chosen because they were fractures into the joint. They were restricted to fractures of the tibia. The treatment of effusion and hemorrhage around the joint is quite important. Surgical interference, or needling, should be avoided if possible. I mentioned a sharp angle of elevation. One of these patients came in with the upper end of the bone very much comminuted and with much swelling around the joint. I elevated the foot and leg on a Thomas splint to an angle of 45 degrees. Within three days almost all the ecchymosis was down in the thigh, almost to the hip, and with great reduction of swelling in the knee joint itself, as a result. These comminuted fractures in this cancellous type of bone heal rather faster than simply straight fractures; therefore I think within two weeks we should begin a little movement. I have had good results, a little later in the course of treatment, with breaking up of the adhesions gently under anesthesia.

I believe the Thomas splint is excellent from the first, because one may take both splint and patient right down to the fluoroscopic room and mold the fragments into place as he wishes right under fluoroscopic vision.

Dr. E. L. Tuohy (Duluth) gave in detail two case reports as follows:

(a) An Instance of Body Dehydration, Diarrhea, Acidosis,[1] Anuria, and Calcium Fixation.

A female, aged 38. Sudden overwhelming bloody diarrhea following three hours after eating certain "canned tomatoes."

Four striking trends developed:

1. Profuse bloody loose bowel evacuations.
   (Loss of body alkaline bases)
2. Dehydration and drop in blood volume.
   (Polycythemia—hypotension)
3. Acidosis and anuria.
   (Disruption of normal osmosis)
4. Uremia—Calcium imbalance.
   (Cheyne-Stokes respiration—near tetany)

This report is presented to illustrate the devastating influence on the body produced by decided breaks in important physiologic body constants. While postmortem confirmation of tissue changes is not available and the data accordingly incomplete, I ask you, nevertheless, to consider the rapid culmination of events leading to this woman's death. When an overwhelming diarrhea dehydrated her and at the same time took out of the body the vitally essential alkaline bases, an acidosis of high grade developed. This led to further anhydremia, because as the tissue cells became more acid the fluids of the blood (and all that was injected by vein) left the blood vessels. The changes in blood pressure and influence upon osmotic pressure were promptly evidenced in a total anuria. Then followed a piling up in the blood of the acid phosphates and nitrogenous metabolites. On the one hand there developed the shift toward a more marked acidosis, begun by the diarrhea with its drainage out of the body of its sodium, potassium and calcium salts. On the other hand, the ammonia compound retention and the well known trend toward an alkaline shift in uremia dominated the picture as far as the respiration was concerned. Despite an acidosis the patient had periods of apnea and fairly characteristic Cheyne-Stokes respiration (well known to occur in uremia). Finally, the binding of the calcium in the relatively insoluble form (tricalcium phosphate), by retention of the acid sodium phosphates normally voided via the kidney, tied up the normal loosely held calcium from which arises the most essential ions (when dissociated) in solution. Hence, our patient had carpo-pedal spasm—a sort of "postmortem" rigidity, particularly of the muscles,

[1] The etiology here is unknown. It had the early appearance of $HgCl_2$ poisoning but death was rather more rapid than usual (three days).

thirty-six hours before she died. Many other suggestive breaks come to mind when one considers the mental hebetude, alternating with delirium, shown by this patient, and the profuse bleeding from the gastro-intestinal tract. Was the latter increased by calcium ion loss in terms of blood clotting and bleeding properties?

All fever is apt to suggest to us infection, and we rarely push the matter further. When we look at this temperature curve, however, in terms of the obvious dehydration here evidenced, and when we recall the body's compensating efforts to restore balance, the aim to speed up certain indispensable chemical reactions by increasing available body heat; when we likewise consider the vicious brain influence of anoxemia, the mounting pulse becomes less a matter of "heart failure" and more one of a wasting heroic effort to provide the body cells with their needs. Slides are shown to give a cross section of a few of these physiological episodes. It must be recalled that these are not static; the kaleidoscopic shifts are those of capillary permeability; of water balance; of Donnan equilibria and mineral base sufficiency; of oxygenation and a completion of metabolic breakdowns of fats and proteins; the liver dethroned as the great water and glycogen reservoir.

Some well advised critic may say, "Why all this analysis—what therapeutic good comes of it? Well, it is by a study of the extreme that we come to sense the presence of the less extreme. Should we seek for these body shifts earlier we might be in a position to do something when body balance may be restored. Too often we use intravenous saline or glucose as a panacea. It is not easy to look at a patient and say whether an acidosis or alkalosis exists. We know that patients vomiting severely (post-operative and with pregnancy) usually have an alkalosis and are easily rehabilitated by glucose and saline. The patient here reported had Cheyne-Stokes breathing and yet had a CO_2 plasma combining power of 39.

If we are to maintain water balance we must not wait until the P_H shift is far toward an acidosis.[2] In like manner, if we do use sodium bicarbonate intravenously we must know that the amount needed is heroically large and is not readily and evenly distributed where it is needed. Access to the cells is broken and if the shift to alkaline is made too rapidly the rush of water to the capillary channels is so much of a gush that pulmonary edema supervenes. This has been seen clinically, and laboratory animals show it clearly. Calcium balance and a safeguarding of its ionization deserves our clinical scrutiny.

A recovery may well take place after much lower readings of CO_2 plasma combining power in diabetic acidosis. The reason for this lies in the fact that the alkaline bases are conserved; that we have insulin, which completes the breakup of the fatty acids, and that we have all this occurring close to the body cells themselves. We need rarely resort to the direct use of alkali, unless the plasma bicarbonate is too slowly replenished. Ordinarily the oxidation of the ketone bodies releases the base tied to the ketone acids. In the acidosis of diarrheal dehydration they are lost, and the maintenance of equilibrium becomes very difficult. We may thus state with Marriott[3] that the "underlying factors" are all-important and that we must be alert to the treatment of "symptoms" as they arise, with less attention to the disease entity creating them. Thus will better emergency therapeutics arise.

(b) Primary Carcinoma arising in the Upper Bronchus of the Right Lung; Metastases to the other lung, the spleen, liver, kidneys, and adrenals.

Mrs. P. S.. aged 51, married, was the mother of four children. Three are living and well; the fourth died at 23 of a long-drawn-out pulmonary tuberculosis. The mother was closely in touch, nursing and caring for this daughter, over a period of two and one-half years. (This is important, due to the doubtful diagnostic pulmonary situation that arose with the mother during her illness.)

Her previous health had always been good. She was in the menopause, and had had some excessive flowing; she was inclined to be somewhat obese. A thorough examination two years previous to the onset of this illness failed to disclose any abnormality.

Her illness developed in March, 1928. It consisted chiefly of a distress in the chest, some cough, rather scanty sputum, and a very moderate dyspnea.

A careful roentgen examination in April, 1928, yielded no positive evidence, but there was a suggestion of increased shadows merging into the right hilus. It was not definite enough, however, from which to draw any conclusions. She showed no systemic evidence of weakness, undernutrition or toxemia.

She was then studied by my associate, Dr. P. G. Boman, about the middle of August, 1928. For one month she had had sharp shooting pains, radiating upward, in her right chest, toward the right scapula; her dyspnea had not materially increased; there was a slight elevation of temperature (99.4), and the leukocyte count was 11,200. There were no notable auscultatory lung findings, but there was definite dullness in the region of the base of the right lung. Three sputum specimens showed no tubercle bacilli.

On fluoroscopy, however, Dr. P. G. Boman noted "a fixation of the right diaphragm, with paradoxical movement of the diaphragm in respiration." Thus we had right-sided phrenic paralysis. At the same time, there was noted a small shadow near the upper portion of the right hilus. Quite important, and bearing upon the diagnosis, was a shadow of increasing lung density above the suggestive extrahilus shadow: this suggested and was charted as "compression atalectasis," or a shutting off of air in part from the right upper lobe.

A presumptive diagnosis was made of a primary carcinoma of the lung. Studies were made at the Mayo Clinic in September, 1928. Correspondence with the Mayo Clinic brought some data elicited from examination there. They reported the suggestive shadows mentioned above and stated that they had "the characteristics of either abscess or malignancy—physically

[2]Normal saline intravenous may actually increase the acidosis by displacing bicarbonate, some of which is voided in the urine.

[3]Mariott, McKim, and Hartman, Alexis F., "Newer Aspects of Acidosis." Jour. Am. Med. Assn., Vol. 19, No. 22, Dec. 1, 1928, pp. 1675-79.

the examination of the chest seemed quite negative." She was examined with the bronchoscope at the Mayo Clinic in late September, 1928, and at that time it was stated that "there was a little edema and congestion of the mucous membrane at the opening of the right upper lobe bronchus." A little biopsied material apparently showed no evidence of malignancy.

Frequent examinations were made of the patient between Oct. 24, 1928, and the date of her death (Jan. 12, 1929), at St. Mary's hospital, Duluth. Suffice it to state briefly that in the interim she had two instances of moderate hemoptysis; that she developed increasing pain, and a rapidly enlarging shadow of increased roentgen density pushing upward and backward from the upper portion of the right lung hilus. The best appreciation of the growth was gained through laterally taken films.

Among other interesting studies made were a considerable series of studies of the polymorphonuclear leukocytes, according to the technic of Dr. C. H. Watkins and Prof. Hal Downey of the University of Minnesota. Her hemoglobin went down to 50 per cent, but the red blood cells were normal in appearance and slightly less than 4,000,000. The leukocyte count never advanced materially. While the polymorphonuclears showed some "bizarre forms," the smears studied on two occasions by Dr. Watkins did not show the typical lobulation, hooking, hair formation, etc., so carefully reported by Dr. Watkins, and thought to be characteristic of malignancy, and not uncommonly found in primary bronchus cancer.

The specimens and the microscopic slides thereof indicated a gelatinous type of well marginated carcinoma, globular in form, and about four and one-half inches in diameter, growing upward directly from the right upper lobe bronchus. This, no doubt, explains the failure to see it through the bronchoscope. Dr. P. P. Vinson, of the Mayo Clinic, in a personal communication, states, "Of one hundred and eighty patients whom we bronchoscoped last year, we were able to prove microscopically the presence of primary carcinoma in eighteen, and there were probably as many others who, like your patient, had lesions very suggestive of carcinoma, where positive tissue could not be obtained. The very marked increase of primary bronchial carcinoma is certainly alarming."

There were obvious metastases to the other lung, a very notable degree of metastases to the adrenals; extremely fine metastases in the lungs, the liver, kidneys and other organs.

In summary, it is well to draw attention to the insidious onset; to the dramatic interference with the right diaphragm; to the position which made biopsy through the bronchoscope impossible; to the early raising of material, mucoid in character, which might, in a measure, be associated with the type of cancer found at autopsy. It is well to emphasize the relative frequency of primary bronchus carcinoma, and to note the features of pulmonary tuberculosis which it copies; to keep in mind, however, that a high degree of pain is rarely found in tuberculosis apart from pleuritic distress. Frequently the roentgen studies are of the greatest aid early in the disease; later they are often confused greatly by complications. In this instance the complication of pressure atalectasis aided us; often the appearance of secondary purulent or non-purulent effusions totally mask the primary disease.

Dr. F. J. Hirschboeck (Duluth) read a paper on "Spontaneous Pneumothorax, with illustrative cases." Lantern slides were shown.

DISCUSSION

Dr. A. T. Mann (Minneapolis): I would make just one suggestion, *i.e.*, in cases where you want to make drainage for a short time only, that you use a Mozingo tube because you can keep sepsis farther away from the chest wall.

As the result of the formal ballot, the following men were elected to membership in the Academy:

University: Dr. J. C. McKinley.

Minneapolis: Dr. R. T. LaVake, Dr. Horace Newhart, Dr. T. A. Peppard, Dr. F. C. Rodda, Dr. C. N. Spratt.

St. Paul: Dr. F. E. Foley, Dr. E. K. Geer, Dr. E. V. Goltz, Dr. W. H. Hengstler, Dr. A. G. Schulze, Dr. Alex Stewart.

The meeting adjourned.

Carl B. Drake, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

PROLAPSE OF THE RECTUM IN CHILDREN: John J. Corbett, M.D. (Surgery, Gynecology and Obstetrics, February, 1929, Vol. xlviii, p. 280). Prolapse of the rectum is generally accepted as a descent, with or without protrusion, of one or all of the coats of the rectum. A prolapse may be of any size from that of a walnut to that of an orange, and not infrequently protrudes 3 to 4 inches.

The first consideration in the treatment of prolapse in children is to maintain the organ in its natural position, while the general constitutional condition and muscular tone are being restored to normal. If the prolapsed tissues have been exposed for a considerable time, there may be swelling and edema. Gradual and continued pressure with hot compresses may frequently give comfort and at the same time reduce the mass. An easy method of reduction is to cover the finger with a piece of toilet paper, introducing it into the lumen of the mass, forcing the finger carefully into the rectum, immediately withdrawing. The dry paper adheres to the mucous membrane, and releases the finger. The child should be kept upon its face for a short time thereafter.

Broad strips of adhesive passed anteriorly to anus and from one trochanter to the other so that they do not interfere with defecation will serve well for temporary support.

To prevent the occurrence of prolapse during bowel movement, the child should be required to defecate in the dorsal position into pads of cotton. It is important to keep the stools soft and the rectum lubricated. This is best accomplished by the administration of mineral oil.

Linear cauterization has been used sporadically by different men in different parts of the world. Cauterization sets up an inflammatory reaction in the submucous tissues directly beneath the line of application. In the organization of these inflammatory areas, there is a development of fibrous tissue which firmly binds all coats of the rectal wall to its surrounding structures.

Four linear longitudinal incisions with a cautery are made through the mucous membrane extending up to but not into the anal canal. Care must be taken not to penetrate the rectal wall, especially anteriorly.

R. N. ANDREWS, M.D.

THE MONOCYTE IN ACTIVE TUBERCULOSIS: Kenneth D. Blackfan, M.D., and L. K. Diamond, M.D. (Amer. Jour. of Dis. of Children, February, 1929, Vol. xxxvii, 37, p. 233). The degree of activity in tuberculosis is reflected in the peripheral blood of infants and of children.

A high monocyte-lymphocyte ratio and the presence of epithelioid cells usually mean an active tuberculous infection.

An increasing monocyte-lymphocyte ratio and the persistence of a high absolute monocyte count signify extension of the process.

Reversal of the ratio (a fall in monocytes and an increase in lymphocytes) denotes healing lesions.

In cases in which the diagnosis is questionable, a study of the blood by the supravital technic may lead to a correct diagnosis.

When the diagnosis is established, supravital studies of the blood may be of prognostic value in indicating whether the lesion is progressing or undergoing regression.

R. N. ANDREWS, M.D.

THE TANNIC ACID TREATMENT OF BURNS IN CHILDREN: Albert H. Montgomery, M.D. (Surgery, Gynecology and Obstetrics, February, 1929, Vol. xlviii, p. 277). The importance of having a satisfactory treatment for burns is at once apparent when we recognize the high mortality and the prolonged and deforming morbidity that accompany this group of injuries.

The treatment must aim (1) to stop pain, (2) to prevent toxemia, (3) to insure asepsis, (4) to prevent the loss of tissue fluids, and (5) to prevent contractures and scar formation. All methods make use of the same systemic treatment. Briefly, this consists of morphine to relieve pain and shock, glucose and alkaline solutions to supply body fluids and combat toxemia. In the local treatment of burns the various methods employed fall essentially into these groups: The biochemical or alkaline treatment; the protective method or paraffine treatment; fixation methods. The principle on which this mode of treatment is based is that of healing a wound under a crust.

The use of tannic acid was introduced by Davison in 1925. After cleansing, a 5 per cent solution of tannic acid is sprayed over the wound. This solution should be freshly prepared as it turns to gallic acid on standing. Without clothes or dressings of any kind, the child is placed in bed on a sterile sheet. Any necessary splints or suspension apparatus for the limbs are then applied. Blankets are placed to form a tent over

the bed with one or two electric lights suspended from the roof for warmth and drying purposes. Fluids are forced by mouth or given by hypodermoclysis or proctoclysis. Every half hour the wound area is sprayed with the tannic acid solution but no dressings are applied. In from 15 to 24 hours a dry brown crust, smooth like a piece of leather, has formed over the wound. At the end of 3 or 4 days, all evidences of toxemia usually disappear. In the deeper burns the crust usually loosens in from 2 to 3 weeks, leaving a clean granulating surface. It has been found that if wet dressings of boric acid are used, a rapid toxemia arises that is frequently fatal.

R. N. Andrews, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

VIRGIL J. SCHWARTZ,
PHYS. & SURG. BLDG., MINNEAPOLIS

ARTHUR C. DEAN
CROOKSTON CLINIC, CROOKSTON

THE INCIDENCE OF NASAL SINUSITIS WITH DISEASES OF THE EAR: E. P. Fowler, M.D., New York (Otolaryngology, Feb., 1929, IX, 2, 159). This article gives an analysis of 100 cases divided into five groups: five cases nonsuppurative otitis media, thirty-seven of healed suppurative otitis media, thirty-four of recurrent suppurative otitis media, thirteen of chronic suppurative otitis media and eleven of nerve deafness.

The sinuses were diseased in 84 per cent of these cases, and the ethmoid and maxillary sinuses showed evidence of disease. The ethmoids were involved directly as the chronicity of the inflammation of the ear and the antra indicated much more in recurrent and chronic suppuration of the ear than in healed suppurations. In the healed cases condensing osteitis was not demonstrable, whereas in the recurrent cases it was 12 per cent and in chronically running ears 8 per cent.

The presence of condensing osteitis indicates long or recurrent obliterating pathologic changes. Absorption occurred in 27 per cent of the healed cases, in 18 per cent of the recurrent and in 8 per cent of chronic suppurations of ear. Edema occurred in 51 per cent of the healed cases and in only 38 per cent of the recurrent and chronic cases. Absorption and edema occurred in inverse ratio to the chronicity of the ear discharge. Edema is dangerous. It may at any time light up a local sinusitis or a pansinusitis involving the middle ear in infection and endangering the inner ear or nerve through infection or toxemia.

In the healed cases there is the smallest percentage of involvement of the ethmoids and maxillary sinuses and the largest amount of absorption and edema. If the sinusitis clears up, leaving infection in the ear spaces, the ears may become a menace to the sinuses, thus establishing a vicious circle within the spaces in the ear and nose.

Except for sixteen cases every involvement of the ethmoids and antra in those children was in some degree concurrent, and all but one or two cases were bilateral, except the cases of healed suppurations, of which 50 per cent were unilateral.

In studying the controls it was found that hearing may be an average normal in both ears, when the sinuses show distinct and sometimes marked pathologic changes, but that in such cases history and signs of past suppuration in the ear are present. Of 775 children tested by the audiometer, 361 who showed average normal hearing gave past histories of otitis media.

Arthur C. Dean, M.D., F.A.C.S.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS EXAMINATION REPORT, JANUARY, 1929

BY EXAMINATION

NAME	SCHOOL AND DATE OF GRADUATION	ADDRESS
Briggs, John Francis	U. of Minn., M.B., 1928	862 E. 4th St., St. Paul.
Butzin, Ted Arzt	U. of Minn., M.B. and M.D., 1928	770 E. 4th St., St. Paul.
Canfield, Wayne W.	U. of Minn., M.B., 1928	University Hospital, Minneapolis.
Cook, Edward Noble	U. of Minn., M.B., 1928	889 Lincoln Ave., St. Paul.
Engel, Edward Ewald	U. of Minn., M.B., 1928	1097 22nd Ave. S. E., Minneapolis.
Evans, Robert David	U. of Minn., M.B. and M.D., 1928	1995 Sheridan Ave. S., Minneapolis.
Greeley, Horace, Jr.	Cornell, M.D., 1927	Mayo Clinic, Rochester.
Hegge, Rolv S.	U. of Minn., M.B., 1928	St. Mary's Hospital, Duluth, Minn.
Hetzler, Arnold E.	U. of Minn., M.B., 1928	University Hospital, Minneapolis.
Hubbard, Otto Emil	U. of Minn., M.B., 1928	St. Mary's Hospital, Duluth, Minn.
Hubin, Edwin G.	U. of Minn., M.B., 1928	Ancker Hospital, St. Paul.
Johnson, Detlof Emmanuel	U. of Minn., M.B., 1928	642 Park Drive, St. Paul.
Juers, Edward H.	U. of Louisville, M.D., 1928	Miller Hospital, St. Paul.
Kotchevar, Frank Ralph	Northwestern, M.D., 1928	Eveleth, Minn.
Lenz, Otto Anton	U. of Minn., M.B., 1928	General Hospital, Minneapolis.
Levins, Ida	U. of Minn., M.B., 1928	412 Walnut St. S. E., Minneapolis.
Light, Frank Phenecie	U. of Minn., M.B., 1928	4224 Linden Hills Blvd., Minneapolis.
Major, S. Glenn	Harvard, M.D., 1927	Ancker Hospital, St. Paul.
Manson, Melville Husted	U. of Minn. M.B., 1927; M.D., 1928	500 Harvard S. E., Apt. 18, Minneapolis.
Rusten, Elmer M.	U. of Minn., M.B., 1928	329 Union St. S. E., Minneapolis.
Stevens, Robert Bruce	Wash. U., St. Louis, Mo., M.D., 1927	Mayo Clinic, Rochester, Minnesota.
Strauch, Clauss Burkart	Georg-August U. of Gottingen, Germany, Dr. of Med., 1922	McGregor, Minn.
Verbrugghen, Adrien H. P. E.	U. of Sydney, M.B., 1922	419½ 4th St. S. W., Rochester, Minn.
Ziegler, Newell Richard	U. of Minn., M.B. and M.D., 1928	212 Walnut St. S. E., Minneapolis.

BY RECIPROCITY

Dawson, Emerson Blanton	U. of Iowa, M.D., 1926	Miller Clinic, Hamm Bldg., St. Paul.
Doering, Raymond Edmund	St. Louis Univ., M.D., 1924	732 8th Ave. So., Minneapolis.
Fasting, George F. C.	Rush, M.D., 1926	Mayo Clinic, Rochester, Minn.
Keller, George Frederick	Loyola, M.D., 1928	412 N. 2nd St., Mankato, Minn.
Kintner, Arthur Ruel	U. of Nebr., M.D., 1925	Mayo Clinic, Rochester, Minn.

NATIONAL BOARD CANDIDATE

Stewart, Colin Campbell, Jr.	U. of Pennsylvania, M.D., 1926	Mayo Clinic, Rochester, Minn.

WANTED: PHYSICIAN

Practicing, to take an ethical interest, without investment, in a high class therapeutic product of merit. Will not interfere with daily practice. If sincerely interested, address D-16, care MINNESOTA MEDICINE.

LABORATORY TECHNICIAN desires position in Northwest. Will graduate from Dr. R. B. H. Gradwohl's School of Laboratory Technique, St. Louis, Missouri, April first. Besides routine laboratory work can do *X*-ray and basal metabolism. Address D-4, care MINNESOTA MEDICINE.

FOR SALE—A $9,000 general practice in city of 3,000 in southern Minnesota. Good opportunity to make money from start. Ideal living conditions. Equipment complete with X-ray, diathermy, quartz light, etc. Going on fellowship April 1. Address D-3, care MINNESOTA MEDICINE.

WANTED—Locum tenens two to six months. One year general internship. Am completing year's surgical residency charity hospital. Available July 1. References. Address D-15, care MINNESOTA MEDICINE.

LOCUM TENENS, licensed in Minnesota, for period of 6 to 8 weeks to begin June 1. Address D-11, care MINNESOTA MEDICINE.

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TECHNICIAN experienced in Diathermy — Morse Wave Light treatments, wants position as technician or doctor's assistant. Experienced in typing and office work. Address D-14, care MINNESOTA MEDICINE.

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XII May, 1929 No. 5

LYMPHOSARCOMA OF THE COLON AND RECTUM*

FRED W. RANKIN, M.D., and CHARLES L. CHUMLEY, M.D.
Rochester, Minnesota

EWING has defined lymphosarcoma as true malignant neoplasm arising in lymphatic tissue from proliferation of atypical lymphocytes. Various other terms have been assigned to this type of tumor, such as lymphoblastoma and lymphocytoma. Many considered it identical with the small round-cell sarcoma. Lymphosarcomatosis is the term used to designate the widespread form of the disease.

To Kundrat belongs the credit of having isolated lymphosarcoma from the group of closely allied diseases of the lymphatics, all of which were formerly included under the term pseudoleukemia or aleukemic lymphoma. Kundrat not only described the gross and microscopic changes of this condition but also the clinical characteristics; it is well known that such a study is necessary in order to make a diagnosis of lymphosarcoma in any case. He then described this tumor as one arising from groups of lymph nodes or from collections of adenoid tissue elsewhere, especially that in relation to mucous membranes. He pointed out that in lymphosarcoma, in contradistinction to leukemia and pseudoleukemia, the systemic effects are lacking, the spleen, liver, blood and bone marrow being involved only rarely.

Although Kundrat recognized lymphosarcoma as essentially a regional disease, he found that the growth does not remain limited to the site of origin but extends beyond the capsules of the lymph nodes or follicles, leading to coalescence of the individual elements and infiltration of the surrounding tissues, and then spreading, as a rule, through the lymphatics to the neighboring lymph nodes or follicles; in solid tissues the extension is along the lines of least resistance and in a hollow viscus lined with mucous membrane, it spreads along the submucosa in a circular manner, expanding over a great area, and has been supposed to increase rather than decrease the lumen of such a viscus as the intestine.

Kundrat found that not only is the extension of lymphosarcoma local and regional but that similar growths may also be found in other organs more or less distant from the original site. These usually assume the form of diffuse infiltrations which differ from the ordinary metastatic lesions found in carcinoma or sarcoma in not being nodular and circumscribed. He believed that if a careful search were made in such cases a continuous lymphatic connection could be demonstrated between the primary and secondary growths in that the lymph nodes between the two would be similarly affected. He also believed that the presence of many of the remote formations could be explained by retrograde lymphatic extension rather than by the hematogenous route.

Singer reported a case of lymphosarcoma of the stomach which he considers a substantiation of Kundrat's theory. Ewing believes that the extension of these tumors solely by permeation of the lymphatics is probably variable. Although there is a tendency for the rapidly growing tumor cells to compress the small blood vessels, microscopic study frequently reveals the cells within the lumen of such vessels.

The information with regard to the origin of lymphosarcoma is entirely hypothetical, as is the case in all types of tumors. McFarland considers lymphosarcoma identical with small, round-cell sarcoma. He tabulated the following hy-

*From the Division of Surgery, The Mayo Clinic, Rochester, Minn. Submitted for publication March 20, 1929.

potheses which attempt to explain the origin of the cells making up these tumors:

"(a) The tumor originates from the connective tissues through the phenomenon of anaplasia.

"(b) The tumor originates through abnormal vegetative activities of the lymphocytes in the lymph nodes and other lymphoid deposits in the various tissues of the body. If from the lymph nodes, through continuous multiplication of the lymphocytes until their architecture is destroyed, and the capsule being penetrated by the invading cells, widespread infiltration of the surrounding tissues occurs. If from other lymphoid deposits, not definitely collected in nodes, through continuous and infiltrative growth.

"(c) The tumor originates from lymphoblasts, that is, from the undifferentiated cells of the germ centers of the lymph nodes. If these cells multiply rapidly and without differentiation, there results a tumor composed of small polyhedral cells separated by a delicate fibrillar stroma and blood vessels; if they differentiate, a tumor composed of lymphocytes.

"(d) The tumor originates from embryonal residual cells."

According to Ewing, lymphosarcoma represents a lawless proliferation of the cells of the reticulum and their derivatives, which may be attributed to any irritant which influences these unstable cells over a considerable length of time or in a specific manner. Although evidence has been produced to show that tuberculosis is the etiologic factor in certain cases of lymphosarcoma, the point cannot be accepted as proved. It has been shown that tuberculosis and lymphosarcoma may exist simultaneously; the bacillus of tuberculosis has been found in lymphosarcomatous growths and occasionally lymphosarcoma may be similar to, if not undistinguishable from, certain of the infectious granulomas occurring in the gastro-intestinal tract, such as hyperplastic tuberculosis.

In a series of cases of lymphosarcoma of the colon and rectum two cases of chronic ulcerative colitis were noted in which a malignant tumor developed subsequently; in both cases this proved to be lymphosarcoma. These two cases have been reported by Bargen. In one of them a diagnosis of chronic ulcerative colitis had been made at The Mayo Clinic two years before the time the patient returned complaining of a tumor in the right lower part of the abdomen. The tumor was resected and there were no signs of recurrence one year later, although symptoms of the original infection persisted. The other patient came to the clinic with a typical history of ulcerative colitis; this was corroborated by proctoscopic and roentgen-ray examination.

Fig. 1. Posterior surface of large lymphosarcoma of cecum.

Roentgen-ray examination of the colon, however, in addition to the picture of ulcerative colitis, showed an obstructive lesion in the descending colon which was thought to be inflammatory. The patient's general condition was very poor and after a period of medical treatment colostomy was made in the transverse colon to relieve the obstruction which was present. The abdomen was not explored because of the patient's poor condition and the infection in the colon. The patient died eighteen months later and postmortem examination revealed generalized lymphosarcoma of the Hodgkin's type. One other case in the series presented roentgenologic evidence of healed pulmonary tuberculosis, but in none of the other cases of the series was it possible to find evidence of infection, toxemia, or other form of irritation which might have

served as an etiologic factor in the development of lymphosarcoma.

If infection, chronic irritation or toxemia is significant in the etiology of lymphosarcoma, it seems that this type of tumor would develop more often in the patient suffering from chronic ulcerative colitis, a disease in which not only all three of these factors are present at the same time but a large amount of lymphoid tissue is exposed to their action over a long period of time.

Fig. 2. Very large lymphosarcoma of cecum on section.

A search of the records at The Mayo Clinic revealed eighteen proved cases of lymphosarcoma of the colon and rectum; they were studied clinically and pathologically. Two of the cases have been reported by Bargen and one case has been reported by Swan. In fifteen of the cases the segment of the bowel containing the tumor was resected. In one case abdominal exploration and biopsy of the tumor was made. In another case the tumor was found on proctoscopic examination and biopsy was carried out. The other case was one which has already been mentioned in which colostomy was done for what was thought to be an inflammatory lesion of the colon but which later proved to be a lymphosarcoma.

It is difficult to state the incidence with any degree of accuracy. The disease apparently is rare and a series of cases representative of this portion of the gastro-intestinal tract alone has not heretofore been published. On the other hand, these tumors may be more common than is suspected, owing to the fact that a diagnosis of lymphosarcoma can seldom be made previous to exploration or necropsy, and again some of these tumors no doubt pass for inoperable carcinoma on account of their large size and the poor physical condition of the patients.

Fig. 3. Polypoid lymphosarcoma of the rectum.

Lymphosarcoma has been found in every segment of the gastro-intestinal tract but is supposed to be most common in the stomach and lower part of the ileum. Broders and Mahle reported a series of twelve cases of lymphosarcoma of the stomach and were able to find only one other series as large as theirs. They reported the incidence in this situation as compared with carcinoma as 1 : 68.

Bull stated that the incidence in the small intestine as compared with carcinoma is about

1 : 20. It is well known, however, that the occurrence of any form of primary malignancy of this portion of the intestine is unusual. Nothnagel reviewed nine cases of lymphosarcoma in which the lesions were situated as follows: duodenum, one; jejunum, three; ileum, three; and cecum, two. Kruger-Boas found thirty-seven cases of sarcoma in which the lesions were situated as follows: small intestine, sixteen; ileum and cecum, one; cecum, two; appendix, one; transverse colon, one; small and large intestine, one; and rectum, sixteen. From the latter group the erroneous idea has been obtained that lymphosarcoma occurs commonly in the rectum, but the group is made up of all types of sarcoma and the exact number of cases of lymphosarcoma was not stated. Siegel reviewed thirty-four cases of sarcoma of the gastro-intestinal tract and nineteen of these were of the round-cell type. Libman reviewed about fifty-five cases of sarcoma, seventeen of which were of the lymphoid type. In our series of eighteen cases, they were situated as follows: cecum, thirteen; descending colon, one; sigmoid, one; and rectum, three.

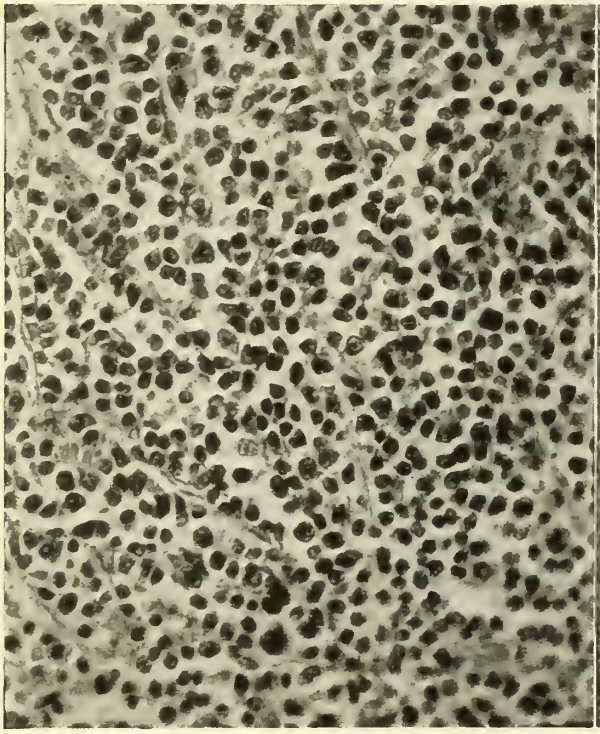

Fig. 4. Diffuse growth of tumor cells in scanty reticulum.

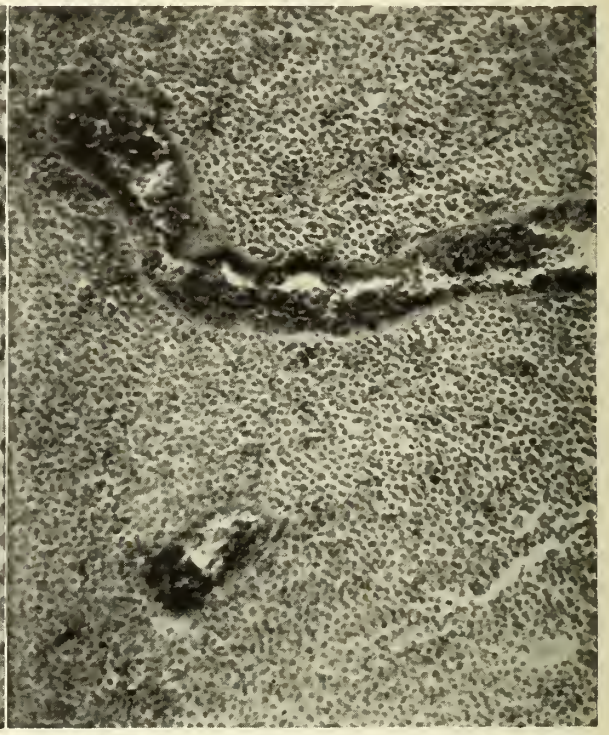

Fig. 5. Diffuse growth of tumor cells. Section from tumor shown in Figure 3.

SEX AND AGE

Lymphosarcoma, according to the literature, occurs about twice as commonly in males as in females. In this series, thirteen were males and five females. The average age was forty-five and four-tenths years. The youngest patient was aged eleven years and the oldest seventy. Only three of the patients were less than thirty years and all of these came within the second decade. Goodman reported a case of a large tumor of the sigmoid which occurred in a child aged four years. It would appear, therefore, that lymphosarcoma of the colon and rectum may be found at any age.

SYMPTOMS

Attention has been called to the fact that a clinical diagnosis of primary lymphosarcoma of any segment of the gastro-intestinal tract is rarely if ever made and the true pathologic nature of the tumor is usually revealed at operation or postmortem examination. There are no signs or symptoms that can be depended on to distinguish these tumors from the more common tumors found in the colon and rectum. The most common symptom in our series was abdominal pain, usually cramping in character but never excruciating. Loss of weight was a constant com-

plaint, the average loss being 17 pounds. Five patients had passed blood from the bowel; two of these had growths in the colon and three in the rectum. Pallor was the cause of registration of three patients. Symptoms of obstruction were complained of by three patients. Six patients had felt a tumor in the abdomen and in two of these cases symptoms did not precede the finding of the mass. At the time of examination at the clinic a tumor was palpated in fifteen of the cases, including the rectal tumors. The tumor in one case was very large; in another case it was about 10 cm. in diameter. The colon was examined roentgenologically in ten cases in which the tumor was found at operation. In six of these a filling defect was demonstrated; in two the tumor was thought to be extrinsic and in one case the report was negative. The average hemoglobin estimation was 63.5 per cent, the lowest reading being 40 per cent. The average erythrocyte count was 3,570,000. Slight leukocytosis was present in most cases, the average leukocyte count being 11,700. Otherwise changes in the blood were not noted. One patient had fever, leukocytosis and a mass in the cecum; a diagnosis of appendiceal abscess was made and at operation the growth had perforated the wall of the cecum and an abscess was present. In none of the cases in the series was the diagnosis of lymphosarcoma made before tissue from the tumor had been studied microscopically. The average duration of symptoms, excluding the two cases of chronic ulcerative colitis, was five and three-tenths months.

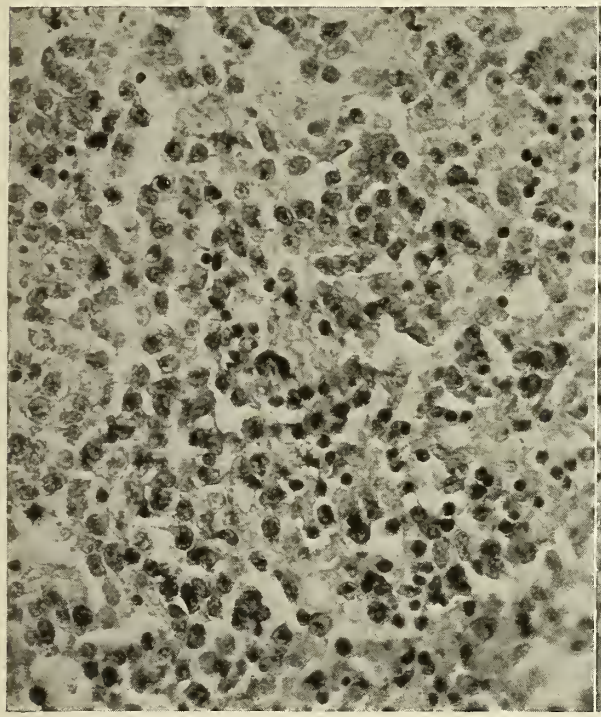

Fig. 6. Section from lymphosarcoma showing tumor cells and lymphocytes. Section from tumors shown in Figure 1.

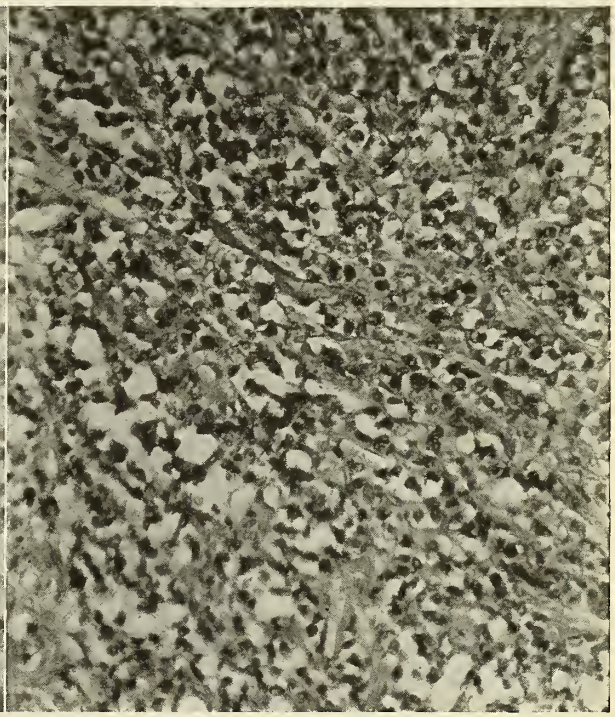

Fig. 7. Section showing tumor cells and abundant reticular tissue. Section from tumor shown in Figure 2.

PATHOLOGY

In the majority of cases the gross appearance of the tumors which were removed at operation was that of diffuse infiltration of the wall of the intestine, with or without ulceration of the mucous membrane. The growths occurring in the cecum were usually large, nodular and irregular, and when viewed from the peritoneal surface appeared to be restrained only by the serous coat of the bowel (Fig. 1). As has been mentioned, some of these tumors were very large (Fig. 2). On section the tumors presented a smooth, homogeneous, compact appearance and replaced the entire bowel wall from the serosa to the mucosa in case the latter was not ulcerated. If the mucosa was still intact, it appeared as thickened and raised folds. The lumen was not always en-

croached on. In one of the cases reported by Bargen, the tumor was small but presented a deep excavated ulcer when viewed from the mucosal side. In one case the growth had extended through all coats of the bowel, resulting in perforation and the formation of abscess. In three cases the tumor resected consisted of a large polypoid mass projecting into the lumen of the bowel (Fig. 3). Two of these were rectal growths and in one of them two lymphosarcomatous polyps were found. The regional lymph nodes were involved in eleven of the fifteen cases in which operation was performed. In one patient who died from the operation, postmortem examination revealed a metastatic lesion in the right kidney.

Microscopically, a lymphosarcoma consists of a diffuse growth of lymphoid cells lying in reticular tissue (Figs. 4 and 5). The structure of the affected lymph nodes and follicles is obliterated. The tumor cells vary in size. The nuclei may be either compact or vesicular and are hyperchromatic; mitotic figures are usually abundant. Small lymphocytes may be present in large number (Fig. 6). DeNoyelles found that the predominant cell in his cases was of the size of the transitional leukocyte of the blood and it contained a lobulated or horseshoe-shaped nucleus. In two cases of this series the lymphoid cells were large; epithelioid cells and a few eosinophiles were present and, except for the absence of giant cells, were very much like those in Hodgkin's disease. In some of the tumors the reticulum is hardly to be recognized and the section appears as a homogeneous mass of cells. On the other hand, the stroma is abundant, appearing either as firm, fibrillar strands between which the cells lie, or it consists of rather coarse interlacing bands of connective tissue (Fig. 7). There are small, thin-walled blood vessels or lymph spaces in some of the sections and the tumor cells may be within the lumen of these vessels.

TREATMENT AND RESULTS

In the fifteen cases in this series in which resection was carried out, four patients died from the operation. Five others are known to have had recurrence and four of these are dead but the fifth was living at the last report. The average length of life of the patients who died of recurrence was eleven and a half months. Six patients are living and apparently in good health, but only two of these have lived long enough since the resection for even the suggestion that they are cured. One of the patients has lived four years and the other three years, without any evidence of recurrence. In one case only exploration and biopsy were done and roentgen-ray treatment was given for a large inoperable tumor. The patient appeared to be well two years later and reported that the tumor had disappeared; however, he was continuing to receive roentgen-ray treatment. In the case in which the growth was situated in the rectum and only a biopsy done and then roentgen-ray and radium treatment given, the patient improved little if any, but is living about four months since the diagnosis was made. One other patient lived eighteen months without treatment other than colostomy, as the tumor was thought to be inflammatory until the postmortem examination revealed its true pathologic nature. Two of the patients who died from recurrence had generalized lymphosarcomatosis.

The regional lymph nodes were involved in eleven of the fifteen cases in which resection was made. Four of the patients died from the operation and four have since died from recurrence. The other three are well as far as we are able to state at this time. Of the four cases in which lymphatic glands were not found to be involved, recurrence has occurred in only one case and was limited to the operative site at the time the diagnosis was made.

We are unable to state the value of roentgen-ray treatment in lymphosarcoma of the colon and rectum. It is usually thought that lymphosarcomatous tumors in general are susceptible to roentgen rays and may be held in check and sometimes cured by this form of treatment. Seven of the patients in the series on whom resection was performed received roentgen-ray treatment after operation. Three of these died from recurrence. One patient did not receive roentgen-ray treatment until recurrence was evident but its use since has apparently held the process in check. As we have stated, roentgen-ray treatment caused the disappearance of a large cecal tumor with involved lymph nodes, and there was no sign of recurrence two years later.

BIBLIOGRAPHY

1. Bargen, J. A.: Chronic ulcerative colitis associated with malignant disease. Arch. Surg., 1928, xvii, 561-576.
2. Broders, A. C., and Mahle, A. E.: Primary lymphosarcoma of the stomach. A report of 12 cases. Jour. Lab. and Clin. Med., 1921, vi, 249-252.
3. Bull, W. T.: A system of practical surgery. New York, Lea Brothers and Co., 1904, iv, p. 389.
4. DeNoyelles, P. L.: Lymphosarcoma of the intestine. Ann. Surg., 1922, lxxvi, 229-237.
5. Ewing, James: Neoplastic diseases. A treatise on tumors. Ed. 3, Philadelphia, W. B. Saunders Co., 1928, pp. 412-422.
6. Goodman, A. L.: Lymphosarcoma of the sigmoid. Arch. Pediat., 1916, xxxiii, 721-728.
7. Kruger-Boas: Quoted by Bull.
8. Kundrat: Quoted by Ewing.
9. Libman, E.: Sarcoma of the small intestine. Am. Jour. Med. Sci., 1900, cxx, 309-327.
10. McFarland, Joseph: Surgical pathology. Philadelphia, P. Blakiston's Son and Co., 1924, p. 311.
11. Nothnagel: Quoted by Libman.
12. Siegel: Quoted by Bull.
13. Singer, H. A.: Some complicated and uncommon gastric lesions. Med. Clin. N. Amer., 1926, ix, 1601-1625.
14. Swan, T. S.: Report of a case of lymphosarcoma of the cecum. Radiology, 1925, v, 71-72.

MEDICAL ENGLISH

What is that which first strikes us, and strikes us at once, in an educated man; and which, among men of education, so instantly distinguishes the man of superior mind, that "we cannot stand under the same archway during a shower of rain without finding him out?"—S. T. Coleridge (1772-1834), The Conversation of an Educated Man.

When I was a member of the John Temple Graves Literary Society at the Statesboro High School we had, in addition to the usual officers, a special officer whom we called the "Critic." The "Critic" attended all meetings with note book in hand and immediately wrote down all errors in the use of English which were made by any of the speakers. At the end of each meeting he reported all mistakes which he had observed and at the same time gave the names of the speakers who had made them.

Having often thought that such an officer would find work to do at many of our medical gatherings and desiring to test out the idea, I have, during the past few weeks, jotted down some of our most glaring blunders. The following are typical examples: "Acute appendix," "chronic sinus"; "operated an appendix," "operated a gallbladder," "operated a case"; "typhoid serum," "cold serum," "flu serum"; "shots of insulin," "shots of 606," "shots" of this and that; "good kidneys," "bad kidneys," "bad liver"; "temperature" for fever; "tubercular" for tuberculous; "proven" for proved.

A patient may have "acute appendicitis," an "acute abdominal condition" or a "chronic sinusitis"; but we have no more excuse for using the terms "acute appendix," "acute abdomen" and "chronic sinus" than we have for "acute foot," "acute face" or "chronic heel." I have operated a cotton gin but cannot understand how some of our skillful surgeons "operate a case" or "operate an appendix." We use the words "vaccine" and "serum" so carelessly that it is impossible for even an intelligent druggist to correctly interpret an oral order for either without detailed explanation. The use of the word "shot" to signify the subcutaneous, intramuscular or intravenous administration of any substance is the lowest of slang.

What is the cause and what is the remedy for this laxity? Teachers and so-called leaders are careless with both the spoken and the written word. Students, interns and young physicians imitate their elders. Just because a "great" surgeon or internist "gets away with it" when he "murders the King's English" does not add luster to his fame. The remedy is a perfectly frank criticism of our practices and a more frequent use of the dictionary. The publications of the American Medical Association are models of correct English—this is particularly true of *The Journal* which is the best edited medical publication in the world.—Allen H. Bunce, M.D., *Fulton County Medical Bulletin,* Atlanta, Ga., March 21, 1929.

EMBOLECTOMY*

With report of a case of removal of an embolus from the brachial artery.

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THE operation of arteriotomy with extraction of an embolus is a comparatively new operation. Although it had been attempted several times before (the first case on record is that of Ssabanejew, 1895), the first embolectomy with good result was performed in 1911 by Labey. In the following year (1912) Key performed the operation in the first of the eight cases which formed the basis of his excellent article in Acta Scandinavica Chirurgica in 1922. In this article, he reports his own cases in detail, also giving a review of the literature on this subject up to that time. His report concerned forty-five known cases with good results in thirteen. Nystrom (1926) gave the total number of cases as being seventy-four with good result in twenty-seven. In all there are now (1927) at least 100 cases on record with successful removal of the embolus in more than one-third of them; but the operation has undoubtedly been performed in a number of cases that never have been published—most likely because of the unsatisfactory results.

It would seem that the Scandinavian countries, especially Sweden, have taken the lead in this field of surgery. In the city and state hospitals of the larger cities in these countries the operation has been performed quite often during the last ten years, and the general practitioners send their cases to the surgeon the moment the diagnosis has been made, not hoping for the re-establishment of the circulation through the mere institution of conservative methods. In the American literature there are comparatively few cases on record, but also here it probably holds true that the operation has been done more often than reported.

The operation concerns mainly the arteries to the extremities. It has also been tried in some cases of pulmonary embolism—the so-called Trendelenburg's operation. But in these cases the operation would naturally have a very limited use, mainly, of course, because of the serious condition of the patient, and the operation requiring more than the average technical skill and speed. Besides, most of the patients who would need the operation die in such a short time that it could seldom be performed early enough. Of late, however (1927), there have been reported a few (4 ?) cases with good results from this attempt at extraction of a pulmonary embolus through an incision in the main pulmonary artery; two of these operations were performed in Sweden quite recently.

ETIOLOGY

The origin of embolism in the main arteries of the extremities is a cardiac or in a few cases an aortic thrombosis (atheromatous patch, aneurismal sac). Most often the underlying cause is a mitral lesion or a myocarditis. In some cases there have been no symptoms or findings of a heart lesion, which probably has been present but not diagnosed.

The occurrence of embolism after operations or during or after infectious diseases has been thought due to an acute myocarditis with thrombi in the heart. In one case (Hellstrom), a twelve year old boy (a severe case of diphtheria treated with large doses of serum), the question arose as to whether or not the serum was the cause of the thrombus found in the heart at the autopsy.

After the use of quinidin in heart cases there have been some reports of sudden death due to cerebral or pulmonary embolism, although this tendency of embolism to occur following the cessation of auricular fibrillation also was noted before quinidin was used (dislodgment of thrombi on resumption of normal auricular activity). (Wilson Hermann, Ann Arbor.)

In cases of patent foramen ovale of the heart an embolism in the arteries of the extremities can be due to a thrombophlebitis of the systemic veins, a so-called paradoxical arterial embolism. Nystrom reported a case of this type, in which operation was performed for emboli of both iliac arteries, at autopsy showing thrombosis of the

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right femoral and iliac veins and an open foramen ovale (also pulmonary and cerebral emboli).

The cases of peripheral embolism, in which operation was performed, seem to be fairly evenly divided between the sexes. Most of the reported cases occur in middle age (thirty-one to sixty-five). Some of the oldest patients operated upon were eighty-two and seventy-eight years old, both with good result (Torell, Michaelson); the youngest, the above mentioned boy of twelve. Key mentions also two other patients under twenty years of age, and several between twenty and thirty.

LOCALIZATION OF THE PERIPHERAL EMBOLI

As a rule the emboli are arrested at the division of a vessel, where the larger arterial branches leave the main artery. There are many more cases on record of operation on the lower extremities than on the arteries to the arms. From Key's statistics the left leg and especially the left arm seem more often affected than the right, although the cases are too few to justify any definite conclusions.

Multiple emboli are quite common and many cases have been reported which had two different embolectomies done at one time.

The arrested embolus will, if left alone, increase in size because of secondary thrombosis, a condition that will naturally tend to produce more complete obstruction and thereby increase the danger of gangrene by blocking part of the collateral circulation.

The thrombus formation takes place mostly toward the periphery, but also to a smaller degree in a proximal direction and varies greatly in different cases. Some cases show extensive secondary thrombosis, as Sundberg's case of embolism in the femoral artery operated twelve hours after onset. The length of embolus with thrombus in this case was 86 cm. In other cases often of considerably longer standing there might be practically no thrombosis; in one of Wideroe's cases, operated eight days after the onset, the embolus was only 1.5 cm. long; in one of Ibsen's cases there was no thrombosis after eleven days. Nicolaysen's case of embolism of the radial and ulnar arteries operated respectively nineteen and twenty-eight days after the onset showed practically none.

At the site of the embolus the intima will suffer, evidenced by the tendency of thrombus formation even after successful removal of the embolus. In regard to the degree of organization of the clot there are great differences. In one case (Nystrom's) the clot was quite adherent after only three and one-half hours standing; in many other cases the embolus was easily loosened from the intima even if the condition had lasted for several days. The vitality of the tissues varies greatly, first, of course, depending on the degree of the obstruction, but also showing considerable individual differences (age, etc.).

The importance of early operation is evident. An embolectomy will almost surely prove a failure after twenty-four hours of total obstruction as far as complete restoration of circulation is concerned. Good results can be looked for if the patient is operated within ten or preferably within five hours after the onset.

Naturally the question will arise—how well will the collateral circulation take care of the affected limb in the different cases without operation? The danger of gangrene would be greater than that following simple ligation of the different arteries, partly because of the secondary thrombosis that might interfere considerably with the collateral circulation, and partly because these patients with emboli often are more or less debilitated and in a generally poor state of nutrition.

The percentages of gangrene after ligation of the main arteries to the extremities (after Wolf, quoted by Key) are:

	Per cent
Art. iliaca communis	50
Art. femoralis communis	25
Art. poplitea	15
Art. axillaris	15
Art. brachialis	4.8

Experience has shown that these figures would be considerably higher in cases of embolism.

SYMPTOMS

The symptoms of embolism in the main peripheral arteries vary greatly according to the degree of obstruction of the vessel in the different cases, the age of the patient, the condition of the vessels and the heart, blood pressure, and the anatomical possibilities of an early established collateral circulation.

In two cases of embolus in exactly the same location one can thus find considerable differ-

ence in the degree of circulatory disturbances and the other symptoms.

In some cases the onset is preceded by prodromes in the form of short-lasting indefinite pain in the same extremity, sometimes in one of the other limbs, this pain very likely being due to a smaller, otherwise not diagnosed embolus. Or there might previously have been signs of smaller emboli to kidney, lungs, or brain (kidney colic, bloody expectoration, or symptoms from the central nervous system). In some cases there are symptoms of successive stops in the arterial tree before the embolus is finally arrested.

The onset is usually quite sudden, but in many cases more gradual, namely, when there is only a partial occlusion of the vessel. The suddenness of onset seems to bear a greater risk of gangrene, since in the cases of more gradual beginning the adaptation to the new circulatory condition can take place more slowly and there is more time and chance for the development of the collateral circulation.

Pain is a constant symptom and is usually sudden in onset and often so severe that the operation of removal of the embolus sometimes would seem indicated for this reason alone. A greater or lesser part of the limb feels cold and numb and loses its strength and power. The disturbance of the skin sensibility varies considerably, is usually pronounced in the more distal areas, gradually disappearing in a proximal direction.

The objective symptoms will naturally be most marked in the distal parts. The color of the skin is pale, sometimes somewhat cyanotic or showing dark blotches. The temperature of the skin is low. The motility of the limb is diminished or partly abolished; but often seems to be more or less preserved in parts that otherwise suffer definitely from the circulatory disturbances. Skin and tendon reflexes are absent.

The embolus itself can sometimes be palpated as a cord-like structure in patients who are not very fleshy and in certain locations, especially in the upper femoral, the brachial and the lower part of the axillary arteries. The pulsation in the artery distal to the embolus is either totally absent or very feeble.

The tenderness to pressure at the site of the embolus has been pointed out as an important symptom (Alman).

The danger of gangrene depends mainly upon the degree of obstruction of the lumen of the vessel according to the size of the embolus and the secondary thrombi, and on the development of collateral circulation. If gangrene sets in, it is a dry gangrene beginning in the most distal parts, extending gradually higher and higher.

As the collateral circulation will take care of the blood supply to at least a part of the affected area, the embolus will, as Key has pointed out, always be found higher up than the upper border of the circulatory disturbances.

In some cases this border may change; if the circulatory disturbances spread upward it is due to a more complete obstruction or blocking of the collaterals from secondary thrombosis or due to another embolus higher up. One of Key's cases showed symptoms of an embolus in the popliteal artery which was soon followed by signs of an embolus in the arteria femoralis communis. If the upper border moves in a distal direction it would probably mean that the embolus has come loose and moved with the blood stream. Torrell reports a case where the changes of the symptoms seemed to indicate successive stops at different locations (arch of the aorta, bifurcation of the aorta and finally the left femoral artery). The blood pressure will be a factor in determining how far the embolus will move distally.

In locating the embolus in the different arteries one should remember the locations that tend to arrest the emboli, namely, the places where the arteries divide.

The cessation of the pulsation in the arteries is of course of high diagnostic value. The extension of the circulatory disturbance proximally will, in general, be a help in locating the site of the embolus, which always will be found proximal to this upper border. In this respect, however, there seems to be a few variations, depending upon the different degrees of occlusion of the lumen of the vessel and the different development and anatomical variations of the collaterals in each case. An embolus in the femoral artery might thus in some cases give more extensive circulatory disturbances than an embolus in the common iliac artery.

An embolus at the bifurcation of the aorta will usually produce marked circulatory disturbances in all or almost all portions of both legs, sometimes also in the lower part of the abdomen.

Pain in the anal region is often a symptom.

Considerable variations in the picture will occur because of the different degrees of obturation of the two branches, an embolus at the bifurcation sometimes obstructing only one of these and thus giving symptoms from only one leg.

Emboli in the common iliac artery usually show disturbed circulation extending above the middle of the thigh. In cases of bilateral embolism in the common iliac arteries the picture is practically the same as an embolism at the bifurcation of the aorta.

Circulatory disturbances including the lower third of the thigh, the knee, or extending to just below the knee, point to an embolus in the common femoral artery; pulsation of the artery can in these cases usually be felt at Poupart's ligament. In cases of embolus in the popliteal artery only the foot and the lower third to half of the leg (crus) will suffer from circulatory changes.

The main sites of emboli in the upper extremities are the axillary and the upper part of the brachial artery; the circulatory disturbances in both cases are found in the hand and a greater or smaller part of the forearm and are so much alike that they can hardly be distinguished from each other. Pulsation can be felt high in the axilla in most cases. Sometimes the embolus can be directly palpated and tenderness to pressure over the embolus is often present.

The diagnosis of peripheral embolism in typical cases is easy, especially with sudden onset, and when the embolus is comparatively large.

In cases with less pronounced symptoms and, with only partial obstruction of the lumen of the vessel, the diagnosis is more difficult. Early, vague symptoms can be mistaken for paresthesias (as in a case of Michaelsson's).

With more marked circulatory disturbances one has to consider in the differential diagnosis thrombosis of the artery due to arteritis. Sudden onset, preexisting cardiac disease, recent operation or infectious disease would make the diagnosis of embolism most likely. In arteritic thrombosis the patient usually has had prodromes for a long time, often years, such as the feeling of cold, numbness, neuralgic pain, and cyanosis. Arteriosclerosis predisposes to thrombosis and must be considered.

Another condition that can give symptoms very similar to those of embolism is angiospasm. J. Holst mentions a patient he operated upon for embolus of the femoral artery having given all the typical symptoms of this condition, but found instead a marked spasm of the femoral and popliteal arteries, did a periarterial sympathectomy, and the patient became symptom-free.

Thrombophlebitis with venous thrombosis has been mistaken for embolism in some cases. In this condition, however, the limb is warm, cyanotic and swollen, the sensibility not changed, the pulse can usually be felt and the cord-like, tender vein palpated.

A direct local trauma can sometimes result in a thrombosis of the artery. The history will in such a case give the diagnosis.

In embolism at the bifurcation of the aorta, the diagnosis of acute myelitis or hematomyelia might be made, but the typical circulatory disturbances in emboli cases would decide.

The occurrence of two or more emboli at one time is quite common and almost to be expected, considering the cause and the origin of this condition. In Key's first series of eight cases, multiple peripheral emboli occurred in five, two emboli having to be removed from the same extremity.

The indications for operation in cases of embolism of the main arteries to the extremities should be wide, according to most authors' opinion, these patients having much to gain and very little to lose in being operated upon. The danger of gangrene is great because of secondary thrombosis, and cases of embolism of the bifurcation of the aorta, of the iliac artery, the femoral, popliteal, axillary, and upper part of the brachial arteries should be operated upon as early as possible, if there is no contraindication because of poor general condition, or marked arteriosclerosis.

The shock from the operation is diminutive, and while many of these patients seem to be serious risks they stand the operation remarkably well. Even if the patient seems to be in poor condition, the relief from the severe pain and the prevention of the much more serious operation of an amputation, if gangrene should set in, are indications enough for embolectomy. Soderlund reports a patient with embolism and no gangrene, who was not operated upon, but had considerable pain for at least fourteen days, besides showing a certain degree of paralysis and contracture of the muscles, making the arm unfit for work for several weeks. Nystrom reported a patient who

was seen five days after the onset. No gangrene having set in, the embolus most likely being very adherent and showing secondary thrombi, he decided not to operate, hoping for the return of the circulation. However, a few days later gangrene developed, and an amputation was necessary. Also in some cases of beginning gangrene Key has found the operation worth while, as the line of demarcation by the improved circulation can be moved further distally and consequently the amputation made less extensive. Other authors have suggested ligation of the vessels in these cases of beginning gangrene proximal to the embolus in order to avoid central extension of the secondary thrombosis.

The operation of embolectomy should be performed in local anesthesia if possible. Only in instances where a laparotomy for embolism at the bifurcation of the aorta or the common iliac artery has been decided upon a general anesthesia might be needed.

Incision and approach to the vessel are made, if possible, right over the embolus. After the artery has been exposed, it is (according to Key's suggestion) surrounded with sponges soaked in 2 per cent sodium citrate solution in the hope of preventing any coagulation of blood in the field of the operation. Likewise are the instruments and the surgeon's gloves frequently rinsed in the same solution. A soft arterial clamp is applied to the artery on the proximal side of the embolus; if there should be much bleeding after the artery has been opened it might also be desirable to put clamps on the main-branches (f. inst. profunda femoral or prof. brachial arteries) or on the main artery distal to the embolus (back-bleeding from the periphery).

The artery is opened, if possible, just above or below the embolus, where the intima will be intact and have less tendency to secondary thrombi formation.

If not adherent, the embolus then often will escape without any further manipulation, or slight pressure over the embolus will milk it out of the opening.

If the embolus is adherent to the intima or the incision in the artery has been made below the embolus or in order to deal with secondary thrombi, it might be necessary to use fine probes, scoops or tissue-forceps to loosen or remove the clots. The artery is cleaned out as thoroughly as possible under the circumstances, some authors even having advised irrigation of the lumen through multiple incisions.

Before suturing of the opening the proximal clamp is loosened for a second, so that small pieces of clots that might have been left can escape with the blood stream through the arteriotomy wound; a clamp on the distal side will during this maneuver prevent debris from passing into the vessel below the incision.

The latter is then sutured, fine vaselinated needles and finest vaselinated silk being used; the suture is either continuous or interrupted, including only adventitia and media, carefully avoiding the intima.

Repeatedly it has been necessary to re-open the incision in the artery and remove clots that either might have been overlooked or might have reformed after the closure (thrombi).

Since multiple emboli are a frequent occurrence one should, after the removal of an embolus, make sure that the circulation is restored; if this is not the case, examination might reveal another embolus that should be removed at once, if found in a large vessel.

In more central locations, where it is difficult to approach the part of the vessel containing the embolus, Key advises incision of the artery at a lower point, where the artery is easily reached, and retrograde probing, thereby breaking up the clots and letting the pieces escape with the blood stream. For this purpose an instrument like Babcock's probe for operation for varicose veins (a ball-like round end on a very flexible probe) has been recommended. This method should probably be followed in operations for emboli of the upper part of axillary or of the subclavian arteries.

In embolism of the bifurcation of the aorta, of the common iliac artery, and the upper portion of the external iliac, a laparotomy would give the most direct approach to the embolus; but this being a serious operation for these patients Key advises incision of the femoral artery and retrograde probing as the standard method in these cases. The degree of central bleeding on opening the femoral artery might then give information as to the real site of the embolus (Perman). If the bifurcation of the aorta is the location, there will be considerable central bleeding from the immediate collateral circulation through the hypogastric artery, but very little

central bleeding if there is an embolus at the bifurcation of the common iliac artery.

If the bifurcation of the aorta is the site of the embolus, it seems necessary in most cases to probe from incisions in the femoral artery on both sides.

The danger of this retrograde probing has been pointed out by Nystrom, who reports a case of marked arteriosclerosis, where the probing caused a tear in the intima with a resulting false passage.

Nystrom advises, for certain cases of iliac embolism, retroperitoneal massage from an inguinal incision, causing mobilization of the embolus or its pieces and removal with the blood stream through an incision in the femoral artery.

Other ways of dealing with embolism to the extremities can be mentioned briefly, as they are all of minor importance, compared to the method of embolectomy.

Several cases have been reported, in which an effort was made to break up the embolus by external massage without incision (Embolotripsy), in the hope that the dislodged debris would follow the blood stream to places of less importance from the standpoint of circulation. Some of these attempts have undoubtedly been successful, and Key finds the method indicated in certain cases of embolism, especially in patients in poor general condition, with weak heart or marked arteriosclerosis, or in patients living in localities where it would take too long to get to a hospital and surgical help.

Other authors warn against the method, considering it not only unreliable but also sometimes making conditions worse than before.

If removal of the embolus and thrombi during the attempted embolectomy seems impossible, the artery should be ligated proximal to the embolus to prevent further thrombosis.

An anterio-venous anastomosis has been made in some of these cases,—with very questionable results. The same holds true for the operation of resection of the vessel with direct end-to-end anastomosis (Stewart), or resection of the artery with transplantation of a section of a vein.

RESULT OF THE OPERATION

If the embolectomy has been successful, the symptoms disappear more or less completely; the pain often ceases immediately, the extremity will soon feel warmer and the normal color gradually return. The improvement in the skin-sensibility is slower, but often finally complete. Pulsation is sometimes felt strongly at once after the removal of the embolus, but in other cases that still may give good functional result (Henney, Snyder, Hayer) this does not occur.

Repeatedly, marked improvement of the patient's general condition has been noticed, and also in the heart action itself.

PROGNOSIS

The prognosis after embolectomy is always doubtful both *quoad vitam* and for the extremity itself.

Many of these patients with marked cardiac lesions will soon succumb to this original disease. In this regard the best prognosis is to be expected in cases where the embolism occurs after some acute infectious disease or after operations. In these cases the damage to the heart is less permanent, even if there also are found thrombi in the heart.

Next there is always the danger of repeated embolism, either to the extremities, or to the lungs, brain, heart or kidneys.

In my case the recovery was complicated by showers of small emboli to different places in the brain, starting in on the fifth post-operative day, at first producing symptoms only for a few days, later causing more permanent injury, namely a total left-sided hemiplegia (the unoperated side).

The prognosis for the extremity itself will naturally depend upon the time elapsed between the onset of the embolism and the removal of the clot, the site of the embolus, the chances for established collateral circulation, the condition of the arteries, eventual multiplicity of emboli, the patient's general condition, age, and vitality of the tissues.

The importance of early operation is evident from Key's figures:

12 cases, operation within 10 hours:
Good result in 9
5 cases, operation within 11–15 hours:
Good result in 2
3 cases, operation within 16–20 hours:
Good result in 1
4 cases, operation within 21–24 hours:
Good result in 1

The latter case (Key's own 8th case) was operated upon twenty-two and a half hours after

onset, the longest time on record having elapsed between onset and removal of embolus with complete restoration of the circulation. It is probable that in the late successful cases already reported, complete and absolute obstruction has not been present quite so long as would appear, but that a collateral circulation in reality saved the limb.*

In spite of all the dangers that threaten these patients many of them have been reported to have lived comfortably for several years, some of them even having gone back to their former work.

CASE REPORT

The patient was a married woman sixty-four years old. She had had four children and one miscarriage. Menopause occurred in 1915. As a child she had had measles, diphtheria and rheumatic fever, that was supposed to have been followed by leakage of the heart. In 1910 and 1912 she again had articular rheumatism. In the spring of 1920 she was treated for hypertension. Blood pressure at that time was as high as 280, under treatment coming down to 210.

In April, 1926, she was in the hospital for three weeks, being treated for hypertension and a decompensating heart with auricular fibrillation. The dyspnea was very marked, and an electrocardiogram showed definite myocardial disease. Blood pressure at this time was 180/100. No liver enlargement and no edema were present.

During the summer and fall of 1926 she got along fairly well, being up and about every day and taking digifolin off and on without having any medical attention.

At Thanksgiving time the compensation of her heart again broke down, she developed generalized edema, marked dyspnea, and an enlarged liver. Diagnosis at that time was probable mitral stenosis. She was treated in her home and again responded quite well to treatment. During this period she complained a few times of sharp pain in her left foot and leg without showing any circulatory disturbance however, and no definite diagnosis was made. This pain might have been due to smaller emboli giving no other symptoms.

On February 1, 1927, when awakening in the morning, she had a severe pain in the right arm, which also became pale and cold and could not be moved. She suffered all day without sending for a doctor. When I saw her between 6 and 7 p. m., the right hand, forearm, and distal third of the upper arm were pale, slightly bluish in places and cold to touch. She then had considerable pain in the arm; the hand felt numb, and the skin sensibility was absent in fingers, hand, and for three finger breadths' distance above the wrist. Active motility of the right hand and fingers was almost entirely abolished. No pulsation was felt in the radial, ulnar or brachial arteries. High in the axilla strong pulsation was noticed. The general condition of the patient otherwise was fair.

Diagnosis was made of embolus in the upper part of right brachial or lower part of axillary artery, and the patient was sent to the hospital for operation. The operation could not be started until 10:40 p. m., probably at least fourteen hours after the onset of symptoms.

Under local anesthesia a longitudinal incision was made over the upper part of the right brachial artery, about three inches long. The artery was here found not pulsating, firm, and evidently filled with a thrombotic mass, extending upwards to about one-half inch above the point of division, where the profunda brachial artery begins. No pulsation was present in the latter artery, the clot evidently obstructing the lumen of both main arteries. The pulsating artery proximal to the embolus was temporarily blocked by means of an assistant's fingers. After the artery was surrounded by compresses soaked in 2 per cent sodium citrate solution a small incision was made in the brachial artery at the lower end of the embolus. Some flow of blood from the periphery, but no pulsating blood from above. Another incision was made at the upper end of the clot, just above the place of division of the artery. The upper part of the embolus immediately began to protrude through the incision; not being adherent to the intima the whole embolus, about 4 cm. long, was easily milked upwards and out through the opening in the artery. With the pulsating blood stream that was opened for a second there also escaped through this incision a piece of a clot the size of half a pea, probably having belonged to the upper end of the embolus and become loose when the latter was removed. The upper incision was closed with five interrupted vaselinated silk sutures. The lower incision was next sutured in the same manner, after the free passage of the pulsating blood stream had been ascertained. The wound was found dry and was closed without drainage.

The patient's condition after the operation was comparatively good. There was strong pulsation felt in the lower part of the brachial artery, but none in the radial.

On the following day she had very little pain in the hand, which felt decidedly warmer and was more normal in color. There were still some blue spots on the skin, especially on the inside of the thumb. The finger nails were also blue but she was able to move hand and fingers considerably. The sensibility returned, but more slowly, down to the metacarpo-phalangeal joints on the day after the operation, the fingers still remaning completely anesthetic.

During the next three or four days the condition of her hand and arm improved gradually and markedly; the hand became warm and of good color. On the fourth post-operative day she could move her arm and hand well. The skin sensibility returned more slowly over the proximal part of the fingers. Pulsation was then felt in the ulnar artery and faintly in the radial artery.

The pulse was around 80, quite irregular, but other-

*Geoffrey, Jefferson: Brit. Med. Jour., 1925.

wise of good quality. Her general appearance was good, she was cheerful, talking plainly and had no complaints.

On the morning of the fifth day she showed symptoms of embolism in the left cerebral hemisphere. She was at times more or less stuporous, but seemed to recognize persons. Her speech was inarticulate but there was no paralysis of tongue or face. The right leg was paralyzed, the right arm could be moved a little in the elbow, the right hand looked satisfactory and pulsation was present as on the previous day. The patellar reflexes were present but sluggish. The pupils were equal and reacted normally to light. Some congestion was present at base of both lungs posteriorly. For two or three days involuntary bowel movement and urination occurred. The symptoms of hemiplegia improved markedly and rapidly. Her speech after three days was almost normal; she moved arms and legs well. The right hand continuously looking well. Pulsation in the radial artery was better.

On the eighth day postoperative, the patient was bright and cheerful and had a good appetite.

On the ninth day she again showed signs of another cerebral embolus, speech again inarticulate and this time a definite drop of right eyelid occurred. The muscles of the eyeball showed normal function. The right arm and leg were very little affected. The patient was drowsy, slept much and was irrational at times. Again she improved nicely. On the twelfth day postoperatively, she noticed a definite weakness of the left arm and leg, which during the following weeks gradually developed into a pronounced hemiplegia on this, the non-operated side. The circulation in this arm and leg was seemingly normal; pulsation in all the arteries was good. On the seventeenth day there was noticed a slight left facial paralysis and again some ptosis of the right eyelid. The left arm was then completely paralyzed, while the right, the operated arm, could be moved well and was quite useful. Her speech was fairly good.

During the next month she gradually got weaker, became very restless, and developed Cheyne-Stokes respiration. While the left arm stayed totally paralyzed, the right was seemingly well.

On March 18, she developed a right lower lobar pneumonia and died three days later, seven weeks after operation.

Even though no permanent good could be expected as a result of the operation in this case due to the serious condition of the patient's heart, I feel that the operation was well worth while as it relieved her of quite severe pain, and removed the great danger of gangrene which eventually would have been followed by the considerably more serious operation of an amputation, and it gave her a fairly useful arm during her last weeks when the other arm was totally paralyzed from a cerebral embolism.

PASTEURIZATION

In view of the increased interest in pasteurization due to the adoption of new milk regulations these excerpts from an article by Dr. M. J. Rosenau in the *New England Journal of Medicine,* January 10, 1929, are reprinted for the benefit of our readers. The article in question is based largely on the chapter, "Milk," in Dr. Rosenau's book, "Preventive Medicine and Hygiene," fifth edition.

Milk heated to 145° F. for thirty minutes does not undergo any appreciable physical or chemical change. . . .

Pasteurization prevents sickness and saves lives. Pasteurization is not ideal, but only an expedient. It is advocated because milk is apt to convey the viruses of a number of diseases harmful to man. Pasteurization effectively prevents this hazard. . . . It is the best insurance both for the industry and the consumer and the simplest, cheapest, least objectionable and most trustworthy method of rendering the milk safe. . . . .

Pasteurization does not claim to replace sanitation and common decency. . . . Stale, weak and dirty milk is still stale, weak and dirty after it has been pasteurized. . . .

Milk pasteurized at the temperature recommended (142°–145° F.) sours as a result of lactic acid fermentation just as raw milk does, although somewhat more slowly. Nature has no danger signal for infected milk. Milk may be teeming with typhoid bacilli and other pathogenic micro-organisms without its taste, odor or appearance being changed.

None of the important vitamins in milk, Dr. Rosenau says, excepting Vitamin C, are destroyed by heat. Of this vitamin he says:

The amount of antiscorbutic property, Vitamin C, found in milk depends upon the quantity contained in the feed of the cow. Stall-fed cows in winter furnish a milk almost devoid of antiscorbutic property. Experiments have shown that the temperatures of pasteurization recommended decrease this property in milk about one-half. In any case, cow's milk cannot be depended upon to protect children against scurvy and they should therefore receive orange juice or tomato juice, whether the milk is raw or pasteurized. . . .

The heat of pasteurization does not alter the taste, appearance or digestibility of milk and does not appreciably diminish its food value, except that there may be a diminution of its antiscorbutic property, which in any case should be offset by the use of orange juice or tomato juice. In fact, pasteurization tends to make the curds smaller and in this way perhaps easier to digest. . . . .

One objection to pasteurization has always been the claim that it will put back the cause of clean milk and good dairy methods, because pasteurization will make cleanliness unnecessary and will put carelessness at a premium. Experience has proven the fallacy of this argument. In fact, the general milk supply of large cities has steadily and materially improved despite pasteurization. . . .

Pasteurization is not proposed as a substitute for, but as an adjunct to inspection. Inspection gives us cleaner and fresher, but not necessarily safe, milk. Inspectors cannot be present all the time, and furthermore, even if they were Pasteurs, they could not see missed cases and carriers. Pasteurization destroys the dangers inspection cannot see.

Infants should receive breast milk. There is no adequate substitute. When this is not possible, they should have the best and freshest cow's milk that can be obtained. Whether such milk is to be pasteurized, modified, or otherwise treated rests with the pediatrician. Pasteurization has the well-nigh unanimous endorsement of sanitarians and pediatricians.—*Health News,* Mar. 9, 1929.

PENETRATING GUNSHOT WOUNDS OF THE CHEST WITH RESIDUAL FOREIGN BODIES*

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GUNSHOT wounds of the chest are today more frequently encountered in civil life than twenty years ago. This is due to the growing disregard for human life, which is one manifestation of the so-called "crime wave," and to the ignorance and carelessness of persons handling firearms. Years ago there was a slogan, "Shoot 'em in the guts," which permeated gunfighting society and which has been broadcasted amongst today's bandits, bootleggers and others of that ilk; but the technic which made the old time gunman a sure shot has not been acquired by the newer generation and one result is that the bullet intended for the abdomen too often finds lodgment in the chest. Another factor is the increasing use of the sawed-off shotgun with its load of buckshot or slugs.

In time of war the soldier encountered bullets in profusion, high-explosive shells and shrapnel which sprayed him with small balls and fragments of steel casings, and chest wounds were of common occurrence because of the large percentage of possibilities rather than to individual intent and accuracy of aim.

The purport of this paper is to briefly recount the histories of twenty-five cases of gunshot wounds of the chest with residual foreign bodies, which have come under the personal observation of the writer, and to give vent to some conclusions drawn therefrom and from other experiences with gunshot wounds.

Case 1.—J. J. P., Civil War veteran, received a gunshot wound of the chest in 1864. There was no wound of exit. After recovering from the immediate effects of the wound, he continued to suffer from hemoptysis and some eight years later was diagnosed as having consumption. As a boy I can remember this man and his war history, as he was a local celebrity because of his having a bullet in his lungs. He lived for twenty-five years after receiving his wound and finally died of a hemorrhage from the lungs.

Case 2.—C. R., while trying to escape from the police and engaging in a little gun play, was shot in the chest. Examination at the hospital disclosed no wound of exit. The man suffered from shock, dyspnea and hemoptysis, but rallied and for three days appeared to be on the road to recovery. Then there suddenly occurred a secondary hemorrhage with a faint outcry, a choking and strangling, an outpouring of blood, and in less than ten seconds the man was dead. At the autopsy it was found the bullet had lodged in apposition to one of the pulmonic veins, bruising the coat of the vessel somewhat, and that the constant friction incident to the respiratory movements had induced an ulceration resulting in a sloughing with perforation of the blood vessel.

Case 3.—A Kossu warrior (Liberia, West Africa), in an internecine pleasantry some years previous, had received a gunshot wound of the chest. The man was an object of wonder and curiosity because of his having a "pipe leading down into his lungs." Through mutual friends he was induced to come to the mission hospital for examination and such treatment as might be deemed necessary. Let me here remark, parenthetically, that this was in 1886, when antisepsis was in its incipiency, when *x*-rays were unknown and the writer was young, hyperenthusiastic and practising in an uncivilized country where the surgeon was venerated as a wonder-worker and where malpractice laws were not. The history given by the man was that he had been shot in a raid upon a native town. At first there had been considerable hemorrhage and some pain, but for several months he had kept perfectly quiet, and these had gradually grown less until at the time he came to the hospital, there was a minimum of each. The treatment, by a native medicine man, had consisted of morning and evening applications of grated paw-paw (Carica papaya) melon pulp.

Examination of the man disclosed an opening in the chest wall, just below the right nipple, about half an inch in diameter, and from which, on deep breathing, there exuded a few drops of bloody serum. Careful exploration with a probe demonstrated the existence of a sinus about two inches deep leading directly into the chest cavity and at the bottom of which could be felt a hard gritty substance, evidently a metallic foreign body. It was noted that this foreign body was movable. This exploration was followed by the escape of about a teaspoonful of bloody serum and pus.

The next day the patient was placed under ether, the sinus slightly opened up and the foreign body removed with Tiemans' bullet forceps, the wound was cleansed of clots, mopped out with pledgets of lint wet with 5 per cent carbolized water, wiped as dry as possible, and then loosely packed with lint and iodoform. The foreign body proved to be a "pot-foot." (The natives have a meager supply of lead bullets and in lieu thereof use small fragments of broken iron pots.) The wound was dressed morning and evening with lint and iodoform packing for a few days, then less often until,

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at the end of two weeks, the sinus had entirely healed.

Case 4.—R. S. was wounded in a moonshine raid, receiving part of a load of buckshot in the chest. When examined, at the jail, he was suffering from shock, with hemoptysis, and a small hemothorax, there being a few râles heard in the right chest, and a diagnosis was made of gunshot wounds of the lung with residual buckshot. Several shot were removed from the chest wall and all wounds were dressed antiseptically. No alarming symptoms developed, the hemoptysis lessened and gradually ceased, the wounds healed and apparently no disability resulted from the incident. Some fifteen years later this same man again came under observation and an *x*-ray examination was made which disclosed three buckshot apparently embedded in the right lung and evidently encysted, as they moved with respiration. The man stated he had suffered no inconvenience during the intervening years.

Case 5.—W. C., a Spanish War soldier, had received penetrating gunshot wounds of the chest and had a Mauser bullet lodged in the apex of the right lung, as shown by *x*-ray examination. At the time of the injury he was hospitalized, with shock, hemorrhage from the wound, dyspnea, hemoptysis and slight hemothorax. Absolute rest was carried out, antiseptic dressings were applied and the man treated symptomatically. The immediate symptoms subsided in ten days and at the end of thirty days the man was up and about. For several months thereafter there was an occasional hemoptysis but these attacks became farther apart and less in quantity and eventually ceased entirely. An examination made ten years after the injury showed lung expansion good, free and even, no râles, no hemoptysis, slight bronchitis occasionally and pleuritic pains once in a while, excited by unusual (for him) exertion or climatic conditions. The patient died in 1910 of typhoid fever, an intercurrent disease having no relation whatever to the lung condition, although the latter could be properly regarded as a complication.

Case 6.—J. A. R., in 1906, received a gunshot wound in a display of frontier amenities, the bullet passing through the upper third of the left arm, penetrating the chest wall and lodging under the anterior end of the seventh rib. Under antiseptic treatment the wound healed without complications and the man apparently enjoyed good health for years after. He served during the World War without reporting for sick call, and upon being discharged no defects were noted. On January 8, 1923, during the course of a routine examination, stereoscopic *x*-ray plates of the chest were made and these showed the diaphragm shadows clear on both sides, no evidence of fluid in either chest, heart and aorta normal in size, shape and position, and no evidence of pulmonary pathology. There was a metallic foreign body, apparently a revolver bullet, just under the anterior end of the seventh rib on the left side which did not appear to be in the lung tissue. Inasmuch as the bullet was causing no trouble there was no indication for treatment and it was left undisturbed.

Case 7.—H. J., on October 10, 1917, at the Argonne, received a shrapnel wound of the right chest, the fragment entering in the axillary region. He was treated at various hospitals for several months and finally landed in Base Hospital 24 near Bordeaux. Returned to the U. S. A. March 14, 1919, and through Greenhut Hospital, New York, to Camp Dodge G. H., where he arrived April 1, 1919, and was discharged without any attempt having been made to remove the foreign body. *X*-ray plates made July 20, 1919, and October 21, 1920, showed a metallic foreign body about one-half by three-quarters inches, quite thin and with ragged edges, lying on a level with the third right rib anteriorly and about four inches to the right of the median line.

At an examination made March 24, 1921, the man complained of pain in the right chest, inability to lift as he used to, and expectoration of blood when he lifted hard. He showed no apparent disability. There was a scar one inch long at the right posterior axillary line, healed, non-adherent, without deformity, and with no apparent loss of tissue and no atrophy. All vital organs and extremities apparently normal. A chest examination made September 1, 1925, showed the chest broad and well developed, expansion equal and good, and no râles or adventitious sounds. The diagnosis was chronic fibrous pleurisy.

Case 8.—H. C., on June 7, 1918, at Chateau Thierry, received a gunshot wound of the left chest. Treated at Paris Hospital No. 1 for one month, Base Hospital No. 1 for a month and Base Hospital No. 8 for another month, he returned to the United States January 16, 1919, at which time the wounds were healed. About May 7, 1920, he had a hemorrhage from the lungs of about four ounces in quantity. An examination a week later showed a well formed chest with movements of the left side restricted. There was a scar reaching from the upper part of the left axillary fold to the side of the seventh dorsal vertebra which was adherent to the deeper tissues. Vocal fremitus everywhere was felt; the percussion note resonant except over the scar area. No râles were heard. An *x*-ray plate was made, but in the reading thereof no mention was made of a foreign body. More than three years later an examiner, in making a fluoroscopic examination, discovered a metallic foreign body, 4 mm. x 6 mm., apparently in the upper border of the seventh rib. A plate was immediately made and the foreign body was definitely located in the eighth rib posteriorly. In 1923 this man fell into the hands of two physicians, one of whom suffered from moral imbecility and the other from the paranoid residuals of a dementia præcox, who undertook to operate for the relief of the painful adherent scar and the removal of a callosity on the rib. No relief followed this operation, but one result was an infected perforation of the pleura and the formation of a sinus. A month later it became necessary for a competent surgeon to make a remedial operation, at which time the sinus was excised and a bony spur and two-thirds of the 7th rib removed. The foreign body was not removed. After four weeks in the hospital the man was placed on home treatment and the wound soon healed. When last seen (1927) the man complained of pain on moving the left arm and, on deep breathing, pains running parallel with the ribs around

his left side. The scar (of the gunshot wound and postoperative) on the left side of the thorax, extends from the spine to the posterior margin of the axilla at the level of the angle of the scapula, the spinal end of the scar being depressed and adherent and the balance non-adherent. There is some bronchitis, and a neurasthenia with anxiety neurosis has developed. The man was a chiropractor before entering the service but has been compelled to change his occupation and is now working as a drug clerk.

Case 9.—B. W. At Soissons, France, on July 18, 1918, this man received a gunshot wound of the right arm, with a compound comminuted fracture; a gunshot wound of the left supraclavicular fossa with a foreign body lodged in the upper lobe of the right lung; and an injury to the left brachial plexus. There later developed an abscess of the upper right lobe and the patient was placed under observation for pulmonary tuberculosis. The suspicions were not at that time confirmed. On April 13, 1920, at General Hospital No. 28, Fort Sheridan, Illinois, there was made a resection of the third rib at the sternal junction and the foreign body was removed from the upper lobe of the right lung, after having been residual for twenty-one months.

On March 11, 1921 a diagnosis of active incipient pulmonary tuberculosis was made and the man placed on suitable treatment. When examined August 2, 1927, at U. S. V. H. No. 106, Minneapolis, Minnesota, he complained of pains on both sides and across the front of the chest; coughed slightly during the day; seemed to have a cold all the time; weight 155 pounds; pulse 84; temperature 98.6 at 2:00 P. M. and blood pressure 110-70. The man looked well, was well developed and well nourished; the right shoulder drooped; there was a depression above and below each clavicle, a large healed scar on the right chest, the chest being long, medium broad and flat with poor mobility. The right chest was seemingly fixed. Fremitus was absent and resonance diminished from the third rib to the sixth dorsal spine on the right and from the second rib to the fifth dorsal spine on the left. Increased whispered voice was heard from the second to the fourth dorsal spine. Large coarse râles were present under the scar on the right chest and friction rubs were heard at the base. The conditions found at this examination were diagnosed as: chronic pulmonary tuberculosis, arrested; chronic fibrous pleurisy at right base; paralysis of the left brachial plexus and a traumatic neurosis.

Case 10.—E. J. On July 20, 1918, at Soissons, France, this man received a shrapnel wound of the left lung. He was confined to B. H. 26 for one month, was very weak and coughed up blood for ten days and had some fever and chills. He returned to duty but in July, 1919, while in Germany, was sent back to the hospital for a recurrence of the hemoptysis, pains, chills and fever. The man was unable to do heavy work and after leaving the hospital was put on light duty. In November, 1919, at Camp Taylor, Kentucky, an *x*-ray showed a small piece of shrapnel in the lower left lung. *X*-ray examinations made in 1921, '22, '25 and '26 failed to show any foreign body. In September, 1921, a diagnosis of active pulmonary tuberculosis was made at Thomas Hospital, Minneapolis, and during a fluoroscopic examination at this time there was noted a foreign body, the size of a pea, at the level of the tenth rib and just within the left pleural cavity or outer zone of pulmonary tissue, from which a dense band of adhesions extended to and was adherent to the middle third of the left diaphragm. The diagnosis today is: pulmonary tuberculosis, moderately advanced, arrested; chronic fibrous traumatic pleurisy with adhesions and deformity; foreign body in left lung.

Case 11.—R. O'L., on July 21, 1918, at Soissons, France, received a high explosive wound of the chest, a fragment of metal passing through the lower angle of the right scapula and lodging in the lung. The wound was dressed as a superficial one for three days before a foreign body was discovered in the lung. In September, 1918, the man had pneumonia; in November, 1918, he suffered a slight hemorrhage from the lung and another in May, 1919, which lasted two hours with much loss of blood. He had had about a dozen small hemorrhages up to July, 1920, when he experienced a large one while in St. Mary's Hospital, Minneapolis, after which the hemorrhages grew smaller and less frequent, and he went from December 1, 1920, to March 21, 1921, without any. October 18, 1922, there occurred a profuse hemorrhage, since which time there has been no recurrence although there has always been some slight tinge of blood shown in the first sputum raised each morning. Since 1920 the man has done no heavy work. In May, 1926, there was a recurrent hemoptysis, since which time there has been only an occasional slightly blood-tinged mucus. At no time has there been noted any evidence of pulmonary tuberculosis.

Several *x*-ray examinations have been made from 1921 to date and all show a metallic foreign body 2 mm. x 2.5 mm. lying in the sagittal plane of the right second rib and about 1.5 inches to the right of the great vessels, which shows evidences of an old pneumonic process around it with thickened branch markings extending outward. The lung apex is clear.

There has been no change of position of the foreign body in the past seven years and it is most probably encysted.

Case 12.—H. T. M., on July 30, 1918, at the Marne, received a high explosive wound of the right chest. Two pieces of metal entered the outer chest wall at the ninth rib, passing backward and lodging near the spine; one of these was removed by operation. Infection followed and pleurisy with empyema developed; he was in bed six weeks. In November, 1918, he suffered an attack of influenza. Apparently there was very little injury to the lung tissue as he presented only slight disability when first examined by me July 20, 1919, his principal complaint being pain in the right chest on deep breathing, shortness of breath and nervousness. The *x*-ray October 30, 1919, showed an irregular metallic foreign body three-eighths of an inch by one-quarter inch opposite the end of the twelfth rib and about three inches from the spine. On February 25, 1920,

there was noted a slight lagging of lung expansion on the right side, but no râles were heard. October 18, 1922, there was noted a chronic pleurisy and on May 18, 1923, there was noted decreased fremitus and impaired resonance, breath sounds being absent from the seventh rib down on the right side in the infra-axillary region; the other organs were normal. In 1925 there was noted a persistent afternoon temperature, loss of weight and strength, and the man was hospitalized for observation for the lung condition. Diagnosis: pulmonary tuberculosis, chronic, minimal, non-active.

Case 13.—A. L. P., at the Albert front near Rheims, France, on August 12, 1918, received shrapnel wounds of the right shoulder and left hip and shoulder.

An *x*-ray examination made April 12, 1920, disclosed a fragment of shrapnel, apparently encysted, in the upper part of the right lung; also an old united fracture of the sixth rib. Another, made November 24, 1922, showed a slight peri-bronchial infiltration in the right apex and along the trunks in the first and second interspaces on the right. There was a metallic foreign body about the size of a pea, irregularly quadrilateral in shape, lying just below the inner end of the right clavicle at about the junction of the first rib with the manubrium.

An examination made February 29, 1928, showed a chronic pleurisy of the right side.

Case 14.—T. J., on August 16, 1928, received a penetrating machine gun wound of the chest, the bullet entering anteriorly. He was treated at B. H. No. 17 (Digon), *x*-rayed and the bullet located but not operated upon. The wound healed in a short time and the man returned to the United States, where he took up blacksmithing.

The patient was first seen by the writer January 11, 1928, when he complained of tiring easily, soreness in the chest, and loss of six pounds in the past ten years. Inspection showed a fairly long, broad, deep, flat chest. The man was well developed but rather poorly nourished. The clavicles were prominent, clavicular notches retracted, but excursion good, expansion fairly good, and color fair. The subdermal fat was not markedly decreased, there was no muscle spasm, and no increase of tactile fremitus. The percussion note of the right was impaired above the second rib and fifth dorsal spine; no change was elicited on the left. Auscultation: right, breathing harsh throughout, whispered voice increased over upper lobe, no râles; left, breathing harsh throughout, no change in whispered voice, no râles. Present weight 130 pounds, average 135 pounds, highest 155 pounds, lowest 127 pounds. Pulse 84, temperature 98.6 at eleven A. M. Diagnosis: bronchitis, chronic, bilateral; pleurisy, chronic, fibrosis; valvular heart disease; foreign body in mediastinal region directly anterior to body of the sixth dorsal vertebra.

Case 15.—F. A. S., on September 13, 1918, at St. Mehiel, received a penetrating gunshot wound of the right clavicle, the bullet entering two inches above the middle of right clavicle and resting in the chest cavity opposite the sixth interspace in the nipple line. An *x*-ray examination (June 26, 1924) showed a large pointed foreign body in the plane of the third rib with the point one-half inch from the anterior chest wall; there was slight relative density over the right apex and an increase of parenchymal shadow in the region of the foreign body but no evidence of pleural involvement. An examination March 3, 1925, showed partial paralysis of the right arm, fibrosis of the right lung, chronic bronchitis and hysterical depression with paranoid tendency.

Case 16.—V. J. In the Argonne on October 4, 1918, this man received a high explosive wound of the left shoulder, left knee and ribs. When last examined, May 27, 1926, he complained of weakness of the left arm, shortness of breath, stiffness of the left knee, night sweats, anorexia, and inability to work more than two or three hours daily. Examination showed a well nourished man, six feet tall and weighing 190 pounds. There was a scar eight inches long across the back from the inner margin of the left scapula outwards. Portions of the lower scapula and of one or more ribs were missing. The scar was adherent to the scapula and ribs, producing tension on movements of the left arm. Resonance was slightly diminished below the sixth rib anteriorly and throughout all of the left lower chest below the scar. No râles were heard anywhere. Vocal and tactile fremitus was unchanged. Multiple superficial shrapnel wounds of buttocks, legs, both hands and wrists, back and left forearm were present. Varicose veins of both legs. The diagnosis was chronic bronchitis with fibrosis following gunshot wounds; also disturbed function of the left intercostal nerves. The *x*-ray picture showed the apices clear, but an irregularly shaped foreign body 1.5 cm. by 2 cm. in the lower part of the right lobe. Considerable peribronchial thickening was present in left posterior axilla. The seventh left rib, posteriorly, presented a thickened area which casts a bifid shadow.

Case 17.—W. O. O. This man received a gunshot wound of the left upper arm at the Champagne Front on October 14, 1918, the shrapnel penetrating the arm over the deltoid region. The *x*-ray showed no bone involvement. There was (and is) complete paralysis of the hand and forearm with anesthesia of the outer three fingers, marked atrophy of the muscles of the hand and arm with loss of function. The man was taken prisoner and treated in various German hospitals. In December, 1918, he was returned to the United States Army and treated in several hospitals. He returned to the United States March 11, 1919, and was treated at the Naval Hospital, Portsmouth, Virginia, for three months. In August, 1920, he contracted a cold from which pulmonary tuberculosis developed. The patient thought his chest symptoms were due to having been slightly gassed and made no complaint as he thought they would soon pass away. The diagnosis of active pulmonary tuberculosis was made August 9, 1920, and, although repeatedly *x*-rayed, the foreign body in the chest was not discovered until December 29, 1921. When first seen by the writer July 3, 1919, the injury to the arm evidently overshadowed all other trauma and no mention was made of any chest wound, nor do his previous records contain any mention thereof. What the records of the German hospitals contain,

we know not. At present there is a machine gun bullet just under the left diaphragm which passed through the chest. On March 13, 1928, there was an arrested, moderately advanced, pulmonary tuberculosis, a moderately severe chronic fibrous pleurisy of the left chest and paralysis of the left upper extremity.

Case 18.—E. F. H. October 5, 1918, in the Argonne, this man received shrapnel wounds of the chest and foot. After passing through several base hospitals he reached Camp Grant, from which he was discharged January 16, 1919, with all wounds healed. An *x*-ray taken December 2, 1920, shows diaphragm shadows clear on both sides; no evidence of fluid in either chest; heart and aorta normal in size, shape and position; no evidence of tuberculosis. There is a small metallic foreign body just under the sternal attachment of the second rib on the left side, which is firmly embedded in the lung tissue and moves with respiration. All subsequent examinations show the same condition. Today this man carries a diagnoisis of chronic bronchitis and chronic, mild, fibrous pleurisy.

Case 19.—C. D., on October 6, 1918, while in the Argonne Sector, was severely wounded in the nose, right forearm and chest, the latter wound of entrance indicated by a scar 2 x 1 cm. just to the right of the ensiform cartilage. There was no wound of exit. Three months after injury, foreign bodies were removed from the nose and forearm. An *x*-ray taken June 3, 1922, showed the foreign body located 3 cm. posterior to the anterior chest wall (skin surface) and 5 cm. to the left of the median line. It appears to move with respirations and also slightly with cardiac pulsations. This would seem to indicate the foreign body was adherent to the diaphragm and in close contact with the pericardium. The diagnosis today is chronic fibrous pleurisy due to gunshot wound. The man has been offered operative relief, but refuses the same.

Case 20.—B. C. H. In the Argonne Forest on October 8, 1918, this man received gunshot wounds of the left back, some of which presumably penetrated the lung. Some bullets were removed. Pleurisy developed and the pleura was tapped two or three times. The man was examined frequently but the foreign body in the chest was not discovered until September 29, 1924. An *x*-ray examination shows what appears to be a shell fragment lying beneath the left scapula between the second and third ribs. No pulmonary or pleuritic changes are apparent and no evidence of pulmonary tuberculosis. On March 31, 1926, there was given a diagnosis of pulmonary tuberculosis, moderately advanced, arrested, lues and arteriosclerosis. The diagnosis of pulmonary tuberculosis is not tenable, as the man has a pronounced leutic infection with sputum negative for tubercle bacilli.

Case 21.—G. O. H., received a high explosive wound of the chest on October 8, 1918, in the Argonne. No penetration was suspected and the wounds healed readily. At the time of discharge he was pronounced in good physical condition. An examination made November 10, 1919, showed a scar four by six inches between the scapulæ, quite tender and adherent in its upper part to the spinous processes; another the size of a twenty-five cent piece on the posterior axillary fold about the mid-scapular line and a third quite superficial one in the lumbar region. On April 15, 1920, the man requested an examination, stating he was unable to work and in the course of the routine *x*-ray examination it was noted the left sixth rib had been fractured near the spine and that there seemed to be embedded in its head two pieces of shrapnel, one 1″ x ⅛″ and one ¼″ x ⅛″. Another fragment ¾″ x ⅛″ was noted in the anterior mediastinum behind the upper part of the sternum and apparently ½″ to the right of the median line. This latter fragment moved with cough and deep respiration. On October 11, 1924, a diagnosis of chronic pulmonary tuberculosis, inactive, was made, and February 28, 1927, there was added chronic fibrous pleurisy of the right base. Another examination made April 4, 1927, confirms the previous findings, also showing fusion of the posterior left fifth and sixth ribs.

Case 22.—W. D. C., on October 16, 1918, at the Argonne, received shrapnel wounds of the head and left shoulder. He was discharged March 21, 1919, with a healed gunshot wound of the face and left shoulder and a healed fracture of the clavicle. During the succeeding six years he was given several examinations which were more or less perfunctory because the man denied any disability. However, on February 20, 1925, the man was given a more thorough examination and the *x*-ray disclosed a foreign body in the apex of the left lung. The man stated he had no complaints, had gained in weight since being discharged, had had no sickness during the past year and his body functions were all good. He has had two colds lasting about one week each; does not cough or expectorate unless he has a cold; no hemoptysis since date of his discharge. There was no change in percussion note on either side; breath sounds were normal throughout the chest; no change in whispered voice and no râles. The chest is broad, deep and well developed; the man is well nourished; clavicles are not prominent, nor are clavicular notches retracted. Excursion is good, but the expansion is poor and restricted over both uppers. No evidence of pulmonary tuberculosis was found and a diagnosis of chronic fibrous pleurisy, traumatic, was made.

Case 23.—G. J. This man received gunshot wounds of the right thigh and leg and left chest and back in the Argonne Forest on October 20, 1918. At time of discharge he had two scars just beneath the left clavicle, one scar in the lumbar region and two in the right lower extremity. At an examination on July 11, 1921, he stated, "My back is awful sore and when I move around it feels like some one was sticking a knife in it." On December 11, 1926, while making a fluoroscopic examination, the examining physician discovered a foreign body in the chest. A plate made two days later failed to show the foreign body but one made April 7, 1927, showed it distinctly at the base of the angle, close to the chest wall and outside of the pleura. This body moves upon heavy pressure from the outside and is apparently

held in place by adhesions to scar tissue. There is a chronic fibrous pleurisy but no other evidence of chest trouble.

Case 24.—C. E. N. On October 29, 1918, at the Argone, this man received shrapnel wounds of the left hand and wrist and under the left clavicle, all of which healed leaving small painless scars. An examination report made July 24, 1922, states "heart and lungs negative," but no *x*-ray was taken. Other examinations made prior to August 5, 1924, failed to show any lung involvement. On this latter date an *x*-ray showed a foreign body about the size of a pea, probably a shell fragment, lying in close relation to the transverse portion of the arch of the aorta. A few months later active pulmonary tuberculosis was diagnosed, with chronic fibrous pleurisy of the left base. Fourteen months later a large cavity had formed and tuberculous laryngitis had developed. The foreign body was not giving rise to any symptoms at that time.

Case 25.—A. K. This man was reported killed in action at the Argonne, November 11, 1918. Later reports, however, disclosed he had received a gunshot wound of the right chest, posterior, and had been taken to a French hospital, where he lay one month with a lobar pneumonia of the right middle lobe. On April 5, 1919, he was returned to the United States, reaching the Naval Hospital at New York April 14, 1919, from which he was discharged to duty on April 23, 1919. Since his discharge the man has made no complaints and not until November 17, 1926, was it discovered he had a foreign body in his chest. At that time there was a scar just to the left of the superior angle of the right scapula, 1.25" x 1", slightly depressed and adherent, not tender, with no apparent loss of tissue and no loss of function. The *x*-ray showed a foreign body in the right lung, opposite the upper border of the third rib and 1½" from the margin of the sternum. A lateral plate showed the body opposite the fifth dorsal vertebra and about 1.5" from the anterior surface of the vertebra. Today this man reports no disability of any nature and receives no compensation, which is far removed from being killed in action.

From observation of the cases here presented, from previous military and police experience, and from research work in ballistics, the following deductions have been drawn:

Penetration of the chest cavity by a foreign body depends upon several factors such as:

1. Shape: Pointed, sharp-edged, flat or round.
2. Size: Large, medium, small.
3. Consistency: Hard, soft.
4. Force or Energy (Velocity): Strong, weak, spent.
5. Movements of missile:
   a. Forward, due to impulse of powder explosion or other motivating power.
   b. Dropping, due to gravity.
   c. Lateral, due to wind pressure.
   d. Revolving on long axis, due to rifling of gun barrel.
   e. Revolving on short axis (tumbling), due to air resistance; also to ricochet.
6. Resistance of Tissues Traversed: Soft, medium, hard.
7. Deflecting Obstructions: Clothing, soft tissue, cartilage, bone.
8. Explosive Effects are missing because of the lack of fluid contents and the free outlet of expansive force through bronchi and trachea.

Damage to the lung tissue depends upon the size and shape of the foreign body, its speed, and revolution, if any, upon its short axis.

Shock is not always present in wounds made with modern bullets, which are made of hard non-expanding metals, or are jacketed to prevent expansion. Much and varied experience has proved the small calibre modern bullet of high velocity may penetrate and even perforate vital organs without giving rise to symptoms of shock, and often, where there is stress of excitement or intensive purpose, without even causing an immediate decrease in the physical stamina of the wounded person. A low velocity or spent bullet or an irregular shaped fragment of shrapnel most usually produces shock. Individual physical conditions, resistance and neuropsychiatric reactions play a large part in the origin and continuance of shock. Intoxication, by dulling the sensibilities and creating an artificial belligerency, tends to prevent shock, and because of this fact intoxicating liquors have been designated "Dutch courage."

Dyspnea is present in all cases.

Hemoptysis is noted in 75 per cent of all cases.

Hemothorax is found in 90 per cent of the cases as a direct result of injury to intercostal blood vessels and in 30 per cent of the cases due to injury to pulmonary blood vessels. Hemothorax is frequently caused or aggravated by too early transporting of the patient, a procedure which experience has shown triples the incidence of hemorrhage.

Pneumothorax occurs frequently in cases of injury due to missiles of large caliber or size, but in less than 3 per cent in wounds due to small caliber bullets.

Emphysema increases in frequency with the size of the missile.

Pleurisy due solely to bullet traumatism is rarely seen today, but is frequently noted as a complication where there has been prolonged exposure to severe weather conditions immediately following the injury or where the injury is due to shrapnel.

Infection, when seen, usually depends upon the nature of the missile, the sterility of the first aid dressing and the later introduction of septic foreign matter into the wound.

Abscess is rare, as modern missiles are practically aseptic. Infection may occur in cases of ricochet, where the bullet comes in contact with some septic substance, where pieces of clothing or other extraneous matter are carried into the wound, where there is an intrapulmonary infection or where infection is introduced via a careless or contaminated first aid dressing.

Gangrene is very rare, as the patient usually succumbs before that stage of the infection is reached.

Symptoms may be grouped into the immediate, late and remote, as follows:

Immediate.
- Shock.
- Hemorrhage from wound.
- Concealed hemorrhage.
- Hemoptysis.
- Dyspnea.
- Moist râles.
- Consolidation of lung.

Late. (Within three months.)
- Traumatic pleurisy.
- Traumatic pneumonitis.
- Secondary hemorrhage.
- Infection.
- Pulmonary abscess.
- Dyspnea.
- Cessation of hemoptysis.
- Fever.
- Anxiety neurosis.

Remote. (After three months.)
- Infections.
- Traumatic pleurisy, simple, with effusion or with empyema.
- Cessation of hemoptysis.
- Secondary hemorrhage.
- Tuberculosis.
- Sinus or fistula.
- Encysting of foreign body.
- Intercurrent disease.

Diagnosis.—In immediate cases the diagnosis depends upon the history of the injury, the symptoms and the *x*-ray findings. Care must be taken to detect malingering and not to be misled by any delusions that patient may have or by the overshadowing symptoms of synchronous complicating injuries. In the later stages of the injury the surgeon seeing the case for the first time may be misled by the lack of acute localized symptoms. Errors in diagnosis are due to failure to correctly interpret symptoms (which failure may be due to ignorance, inexperience, carelessness or laziness), lack of *x*-ray facilities or an imperfect or misleading case history.

In the series of cases here presented it was noted that in only three instances was the presence of the foreign body recognized at the time of the injury, while in twenty-one of them the presence of the foreign body within the chest was not diagnosed until many months after the date of the injury, the time varying from one to seventeen years, the average being 5.2 years, or 3.5 years by excluding the one case which went seventeen years. The history in these cases leads one to believe the presence of the foreign body in the chest in many instances was not even suspected and that its discovery was an unforeseen incident connected with the *x*-ray examination which was part of a routine chest examination.

In four cases, the presence of the foreign body was presumed because there was a wound of entrance, no wound of exit and because of the history and symptoms.

Treatment.—Absolute recumbent rest is imperative in the first-aid treatment of all cases of gunshot wounds of the chest. The incidence of hemothorax is tripled by early transportation of the patient. Hemostatics, stimulants and external applications of heat are the accepted treatment for the immediate symptoms. Later on, resort may be had to tonics, sedatives, analgesics and those internal antiseptics which are transmitted through the blood stream. All fluids coming from the chest cavity should be examined bacteriologically. Operative measures consist of the removal of the foreign body when expedient and possible. Should an abscess of the lung develop, paracentesis may be considered as a last resort; in case of empyema, excision of a section of rib or other suitable operation may become necessary. Should there be a fistula the same should be cleansed daily or oftener with

mercuric cyanide solution (1-4000) followed by the application of mercurochrome solution (2 per cent) or hexylresorcinol solution S.T. 37. Intercurrent diseases and concomitant injuries are treated as circumstances require.

Prognosis in all cases is grave, 10 per cent of all cases dying, while 90 per cent recover from the immediate effects but suffer from conditions developing later. Hemorrhage rarely causes death after the third day in cases where absolute recumbent rest is maintained. Transportation before the fourteenth day too often gives rise to a fatal hemorrhage. Primary infection occurs in 25 per cent of all cases where pleurisy with effusion develops, and of these one-third die. In cases of streptococcic infection, 27 per cent die and 20 per cent of gas bacillus infections die. Should the patient survive his injuries three months, or long enough to become ambulant, the chances are that the foreign body will become encysted, the irritation will be reduced to a minimum and the patient will live for many years and most probably die of some intercurrent disease.

Death in these cases is either immediate, delayed or remote. Immediate death is due to profuse hemorrhage or to the solution of continuity of some vital nerve trunk. Delayed death (within the first three months) may be due to secondary hemorrhage, septic infection, pneumonitis, or to pleurisy with effusion or empyema. Remote death (after three months) may be due to secondary hemorrhage, septic infection, chronic pleurisy, empyema, tuberculosis or other intercurrent disease.

Intercurrent disease, secondary to the injury, is not only possible but highly probable, especially in those cases where there is a tendency to chronicity in the reparative process. Presuming that the wound is primarily aseptic, and the patient is aseptic to himself, there still remains the fact that the traumatism to the lungs and other tissues has opened a virgin field to infection by those germs known to have an affinity for lung tissue. This would be expected of tuberculosis, yet experience has demonstrated that the incidence of tuberculosis in persons suffering from penetrating gunshot wounds of the chest is no greater than amongst other individuals. While it is true the traumatism opens a field of invasion and decreases the resistance of the patient, the unusual surgical and nursing care given the patient more than counterbalances the deleterious factors and so acts as a prophylactic. After some months, when the condition has become chronic, the surgeon and nurse see less of the patient, the patient perhaps becomes too familiar with his condition, and, as a result of negligence, the infection become implanted on feebly resistant tissues and the mischief is done.

Of the series of twenty-five cases here cited, seven, or 28 per cent, contracted pulmonary tuberculosis, all of whom are today diagnosed as arrested cases. One case carries a diagnosis of arrested pulmonary tuberculosis and a strongly positive Wassermann. In the absence of a positive sputum, the tuberculosis diagnosis is not allowed and this case is not counted in our statistics. Eighteen are marked "no tuberculosis found." Six cases of chronic bronchitis and eleven of chronic pleurisy are noted, but these are to be regarded as residuals of the gunshot wounds rather than as subsequent infections. In four instances the disability at the present time is so negligible as to be rated less than 10 per cent. One case developed a manic-depressive psychosis twenty years after receiving the gunshot wound and one has acquired an anxiety neurosis with paranoia.

DISCUSSION

DR. LOUIS B. WILSON (Rochester): I wish to congratulate Dr. Perry on this most interesting and most excellent paper. I should like to say a few words about it from the standpoint of ballistics.

Dr. Perry noted that of his twenty-five wounds of the chest three were produced by rifle or machine gun bullets, two by pistol bullets and the remaining by shell fragments. I think this proportion is probably fairly representative of wounds of the chest with residual foreign bodies which are met with in base hospitals under war conditions. The proportions, of course, do not hold for the number of wounded or the number of killed, since most rifle and machine gun bullets will pass entirely through the human chest. Undeformed military rifle bullets possess more than enough energy, even at 1,000 yards, to carry them through the human chest. It requires a surprisingly small amount of energy indeed to penetrate the human chest under favorable conditions. Even the .22 long rifle bullet with only 108 ft. lbs. of energy at the muzzle of the gun has been known to penetrate both chest walls of man. Most pistol bullets are well under 400 ft. lbs. of energy. They are usually blunt and of larger caliber than military rifle bullets. They may, therefore, fail to penetrate the chest even though the same amount of energy in a pointed rifle bullet would

carry it through unless the latter tipped, thus presenting more striking surface.

Eighty per cent of Dr. Perry's wounds were made by various irregular metallic fragments. These, even when starting with very high velocities, rapidly become slowed in the air. They also require relatively much greater energies than do smooth, pointed bullets to penetrate equal distances into tissues. In general, however, it may be assumed that irregular metal fragments which have lodged in the chest cavity must have had their velocities slowed to less than 500 foot seconds before getting through the chest wall. This explains the absence of widely disseminated trauma in chest wounds with lodged missiles. Velocities of more than 1,000 foot seconds are usually necessary to produce widely disseminated trauma in soft tissues, like the lung. When a gunshot missile has lodged in the chest cavity, we may safely ignore the probability of trauma at any considerable distance from the track of the missile. Such trauma is usually confined to areas not more than 2 cm. from the track of the missile. Splits in the intima of unpenetrated blood vessels are not nearly so frequent as in wounds made by bullets which have gone completely through the chest. It must not be forgotten, however, that large caliber, blunt pointed pistol bullets and irregularly shaped shell fragments are much more apt to carry infection deeper into a wound than are small caliber, smooth rifle bullets. In experimental firing, small, irregular, metallic fragments have been found to carry charcoal from the surface of the animal several times as deep into the tissues as it was ever carried by undeformed military rifle bullets. This is important to remember because in trench warfare it must be assumed that all wounds are infected by bacteria from the clothing or the surface of the body.

RABIES IN NEW YORK STATE

During the year 1928 four deaths from rabies occurred among residents of the State exclusive of New York City: one in Ulster county, one in Nassau county, and two in Westchester county. Two of the victims were adults and two children. Three of the cases did not receive any antirabic vaccine or adequate cauterization of the wounds, while the other, a case with severe face bites, was still receiving vaccine treatment at the time the disease developed.

There were reported to the Department 218 rabid animals in 1928 as compared with 243 in 1927, coming from 88 districts in 1928 as compared with 87 in 1927. In 1926 there were 196 rabid animals reported from 50 districts. While there has been a material reduction in the number of rabid animals reported from Nassau and Westchester counties as compared with two years ago, the number still remains large and the gains have been nearly offset by increases elsewhere. There were 29 rabid animals reported from Orange county as compared with 3 in 1927; 17 from Suffolk county as compared with 7 in 1927, and 30 from Ulster county as compared with 8 in 1927. The disease has now spread up both sides of the Hudson river as far Columbia county on the east bank and Greene county on the west. In March an additional focus developed in Malone, Franklin county, believed to have been introduced from Canada.

Sixty-five districts were under certification of the State Commissioner of Health as to the existence of rabies on the first of January, 1928. Dring the year 63 districts were added and the certification was rescinded in 3, leaving 125 at the close of the year. The long incubation period in this disease makes it necessary that a considerable period of time elapse after the last report of a rabid dog is received before certification is withdrawn so as to insure that new cases will not develop thereafter. It has been found very difficult, however, to secure enforcement of the present law requiring muzzling and the collection and disposal of stray dogs for more than a brief period after a rabid animal is discovered. The results are shown in the failure to effect any material progress in the suppression of the disease.

Unfortunately the number of human rabies cases, always agonizing and inevitably resulting in death, do not give the full measure of human suffering for which rabies in dogs is responsible. During the year 221 individuals were either bitten by rabid animals or so exposed to their saliva as to necessitate their being given antirabic vaccine. This consists of a course of injections over a period of fourteen days. The injections are quite painful in contrast with the biologic products used to prevent typhoid fever, whooping cough, diphtheria, etc., and are justified only by the severity of the disease it is desired to prevent.

An amendment to Section 25-a of the Public Health Law will be requested of the Legislature in an effort to secure better and more continuous enforcement of the law in certified districts.—*Health News,* March 11, 1929.

ACTIVE TUBERCULOSIS AND CANCER IN THE SAME INDIVIDUAL*

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A YEAR ago, we presented a preliminary report under the title "Active Tuberculosis and Cancer with Report of Two of Our Cases." Since then, we have been able to find records of six more cases at Glen Lake Sanatorium and have found many reported in the literature.

The common opinion among medical men is that cancer and tuberculosis, both active in the same individual, is a rare state of affairs. Then, to find the two processes active in the same organ or tissue is still more rare. It has been our good fortune to find, at our Sanatorium, records of eight cases in which the two disease processes existed in the same patient and in one of these there was a co-existing lesion in the same organ. Three of these cases came under our personal observation.

Various authors report the existence and non-existence of antagonism between the two lesions. Weighing the available evidence, pro and con, with the experimental work which has been reported, it does not seem that there exists any pronounced antagonism between cancer and active tuberculosis, nor can it be said that the presence of one specifically favors the development or course of the other, with one exception. Lupus does favor the development of epithelioma. One lesion, however, may be more virulent than the other and stop its growth probably by disturbing the source of nutrition.

There are various good and plausible reasons for these two lesions not occurring more often together in the same individual. The first is that of the age incidence. Tuberculosis, as we all know, is essentially a disease of early and middle life, while cancer, as a rule, comes on in the later decades. Study of statistical tables reveals that from 80 to 90 per cent of the cases of tuberculosis die before the age of 50, while from 75 to 90 per cent of the deaths from cancer occur after 50 years. Muirhead states that in Great Britain the average age for death from cancer is 60 years, thus widening the gap between the age incidence of the two diseases.

The second point of explanation for this infrequent co-existence is that the organs most frequently affected by tuberculosis are not those usually invaded by cancer. Williams[1] has given the distribution in the body of 7,297 cases of primary cancer. In over 80 per cent of the cases, it was found in locations where tuberculosis is relatively infrequent, *i.e.*, breast, uterus, prostate, mouth, lower lip, esophagus and stomach. On the other hand, tuberculosis in adult life is almost always primary in the lung, where few cases of cancer occur.

The third point is the tendency of pathologists in searching for one lesion to overlook the other, by picking, from the gross specimen, tissue for section which is most apt to show typically the lesion grossly more in evidence.

Another point of particular applicability to lesions of the stomach is the relative rarity of tuberculosis of the stomach either primary or secondary. However, Höfer[2] described a rare form of tuberculosis of the stomach, which is frequently diagnosed as cancer clinically.

Bastedo[3] states: "Not only may cancer and tuberculosis attack the same person, but their lesions may lie side by side, they may intermingle or the one may develop in a tissue already the stronghold of the other. Thus regional lymph nodes next to a cancer mass will be considered as metastatic from the cancer and not investigated further. Should these nodes be sectioned and examined carefully many would show tuberculosis."

It is interesting to note that as far back as 1810 there was a diversity of opinion as to the occurrence of active tuberculosis and cancer. It was in that year that Bayle[4] expressed the

*Read before Hennepin County Medical Society, November 28, 1928.

opinion that cancer and tuberculosis could occur in the same individual and, too, in the same organ. In 1830, Rokitansky,[5] on the other hand, claimed that a mutual antagonism existed between the two. Fifteen years later, under Lebert[6] (1844-51), the French school assailed the view of Rokitansky and more recent experience has proven the views of Lebert and Bayle to be correct.

The literature contains reports of a large number of cases of the co-existing lesions in the same individual. In 1,114 postmortems showing cancer 5.5 per cent revealed active tuberculosis. Moak[7] reports several series of autopsies totalling 4,000, which were performed on cases of active tuberculosis, and from 4 to 11.7 per cent of these showed cancer.

We have been able to find reports of approximately 100 specific cases of associated lesions in the same individual. These include cancerous lesions in the stomach, breast, sigmoid, prostate, cecum, esophagus and lung, with the tuberculous lesions in the lung, regional lymph nodes about the site of the cancer, intestine and anal fistula, in varying combinations.

The records of Glen Lake Sanatorium gave us eight cases as follows:

1. Carcinoma of maxilla and pulmonary tuberculosis.
2. Epithelioma of both cheeks and pulmonary tuberculosis.
3. Carcinoma of bronchus and pulmonary tuberculosis.
4. Adenocarcinoma of breast and pulmonary tuberculosis.
5. Basal cell carcinoma of cheek, tuberculosis of fascia over chest wall.
6. Melanosarcoma of intestine and pulmonary tuberculosis.
7. Adenocarcinoma of sigmoid and pulmonary tuberculosis.
8. Adenocarcinoma of stomach and pulmonary tuberculosis.

This last case, adenocarcinoma of the stomach with pulmonary tuberculosis, also falls into the group of combined lesions in the same organ. Sections of the cancerous mass from this stomach revealed, in addition to the adenocarcinoma, very definite tuberculosis. One section shows a tubercle entirely surrounded by cancer cells (Fig. 1); another shows normal gastric glands next to a necrotic tubercle on the other side of which is an area of carcinomatous invasion (Fig. 2).

The literature yielded reports of sixty-one cases of the combined lesion in the same organ. These sixty-one are exclusive of the 173 reported cases of co-existent lupus and cancer which came to our attention. Of these sixty-one cases, the lesions occurred in the lung in twenty, and in the stomach in sixteen, while in two the cancerous lesion occurred in the breast with the double lesion in the axillary nodes. The remaining are scattered over the various organs and regions of the body, as one in the esophagus, one in the prostate, two in the cecum, one in the breast, and so on.

As far as active tuberculosis and cancer of the stomach are concerned, one of three conditions exists: (1) cancer may dominate, infiltrating the tuberculous granulation tissue and preventing a successful invasion by the tuberculous lesion; (2) the tuberculous inflammation may overgrow and destroy the cancer; (3) there may exist a close association of the two diseases (symbiosis) without any appreciable destructive influence of the one upon the other.

Finally, all observers are agreed that caseation puts a stop to all carcinomatous invasion due, no doubt, as Borst[8] and others have pointed out, to unfavorable nutritive conditions.

Various authors, on the other hand, have pointed out the ideal conditions for the development of these two lesions in the same organ. In the stomach, for instance, Faltin[9] considers hyperacidity and disturbed motility as favorable conditions for invasion of the cancer growth by tubercle bacilli. Other authors believe the tuberculosis is first to obtain a foothold because of the fact that the lymphatic glands along the lesser curvature very frequently show tuberculosis and no cancer.

There is still, then, much speculation as to the hows and whys of these two lesions in the same individual or same organ. That they do frequently occur together can not be denied, and we are convinced that this occurrence is more frequent than is generally believed.

Experimental work in this field to date has not yielded a great deal of literature. What reports we have been able to find, however, are inconclusive. For instance, Centanni and Rezzesi[10] studied the question of antagonism between cancer and tuberculosis in animals. Injection of

cancer cells and living bacilli produced no tumors. Simultaneous injection in a different part of the body depressed the development of the tumor, though in some only temporarily. Previous infection of the animals with tubercle bacilli delayed the development of the subsequently inoculated tumor. Injection of bacilli into the tumor partially destroyed it. Dead bacilli had no influence. Tuberculin mixed with emulsion of tumor cells retarded growth.

These results would tend to indicate an antagonism.

Maud Slye[11] has recently pointed out that white mice bred from cancerous stock inherit a tendency to tissue proliferation following trauma or irritation. In these strains, infections are uncommon and, if they do occur, are resisted well. It is possible that this inherited tendency to tissue proliferation might be a defense against the development of tuberculosis.

This question certainly requires further study and investigation.

In conclusion:

1. Cancer and tuberculosis can and do occur in the active state in the same individual and less frequently in the same organ.

2. There is probably neither specific favoritism nor specific antagonism between the two except in the case of lupus, which does predispose to epithelioma.

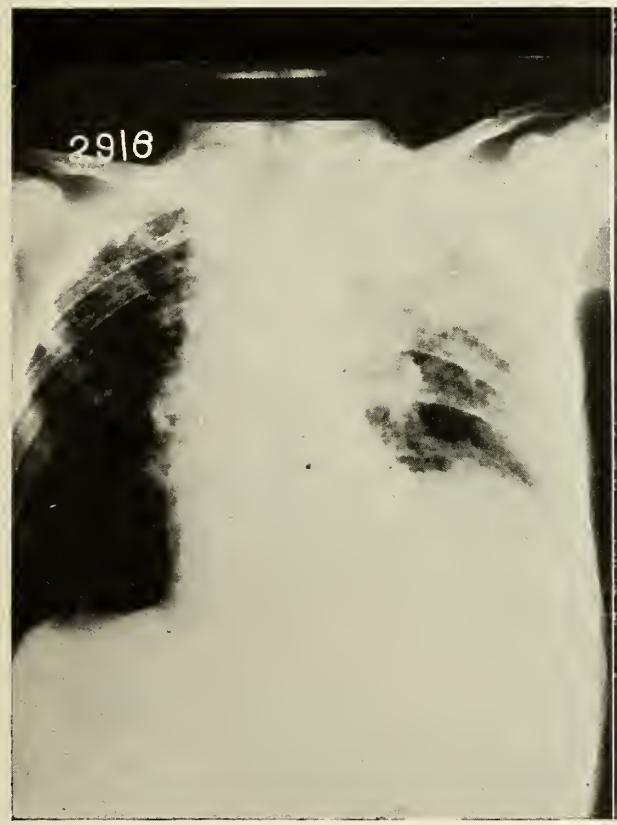

Fig. 1. X-ray plate (Case 1) showing the existing pulmonary lesion.

Fig. 2. Plate of stomach (Case 2) following barium meal showing the massive filling defects in the fundus.

3. Cancer certainly has a tendency to develop at the site of a long standing irritation. It seems that scar tissue is a distinct factor in the production or development of cancer and it is probable that a combination of scar tissue with tuberculous disease makes a double preparation for neoplastic growth, the tuberculous process being both an irritated area and one of enfeebled resistance.

4. The two lesions might more often co-exist were it not that (1) the parts frequently invaded by one are not attacked by the other, and (2) the average age incidence for cancer occurs after the large percentage of cases of tuberculosis have died.

DISCUSSION

Cancer certainly has a tendency to develop at the site of any long standing irritation.

There are of course many cases of inactive tuberculosis associated with cancer.

The literature shows many conflicting views as to which disease is primary. Harris believes that tuberculosis, producing a necrosis and connective tissue proliferation, favors implantation of metastatic tumor cells. In the lungs this certainly is true; however, in our gastro-intestinal cases, I believe that there may be some question as to which disease was primary. In a case reported by U. Simondi[12] of primary cancer and progressive tuberculosis in the same lung, the tuberculosis predominated to such an extent as to obscure everything else.

Fig. 3. The stomach (Case 2) removed post-mortem, showing the large cancerous growth. The probe extends from the cardia to the pylorus.

Fig. 4. Same specimen as Figure 3, opened, showing large mass of cancerous tissue.

CASE REPORTS

Case 1.—The patient, a white female aged 66, was admitted to Glen Lake Sanatorium Dec. 4, 1925, complaining of:

1. Inability to work past eight months, weakness and anorrhexia.
2. Blood streaked sputum, cough, and severe abdominal pain for five or six months.
3. A feeling of pressure for three to four months.
4. Loose stools, not watery, but with the frequent appearance of blood. Constipation at times. Enemas had to be discontinued because they caused severe pain in the rectum and lower abdomen.
5. Presence of a tumor mass in the left side since discovered in March, 1925.

The patient became a Christian Scientist in May and was relieved of all symptoms for one or two months according to the history.

Physical examination revealed a moderately advanced (c) tuberculosis confined to the right upper lobe. A large nodular mass on the right side of the abdomen seems continuous with the right kidney and moves with respiration.

Laboratory reports: Sputum, Gaffky IV to VI. Hemoglobin (Sahli) 40 per cent, 3,940,000 r. b. c., 8,900 white, differential normal. Urine—many leukocytes and faint trace of albumin being only abnormal findings. Stool—occult blood present January 4, 1925; two other specimens negative.

On January 17, 1926, a surgical consultant made the diagnosis of an inoperable cancer of bowel. Three weeks later, after several days of recurrent chills, the patient died. The patient's temperature had varied greatly from 96 to 104.2 degrees, and pulse from 60 to 126.

Clinical Diagnosis:

Moderately advanced pulmonary tuberculosis.
Inoperable carcinoma of the bowel.

Autopsy Diagnosis:

Adenocarcinoma of distal sigmoid.
Metastatic carcinoma of lymph glands and liver.
Pulmonary tuberculosis.
Miliary tuberculosis of spleen.

Case 2.—A white male, aged 50, was admitted to the sanatorium March 22, 1927, with the following complaints:

1. Chills, night sweats.
2. Dull pain in epigastrium referred to left shoulder.
3. Loss of forty pounds in weight in about one year's time.
4. Diarrhea alternating with constipation.

Physical examination revealed evidence of tuberculosis in the upper and middle lobes of the right lung, the *x*-ray, however, showing parenchymal involvement to the second rib on the right and the third rib on the left. Later examination showed the presence of a bi-

lateral inguinal hernia, abdominal tenderness on palpation, most marked above umbilicus in midline.

Laboratory reports: Sputum—Gaffky 1 to 11. Hemoglobin (Sahli) 41 per cent; r. b. c. 2,540,000 w. b. c. 10,200, differential normal. Urine, negative, except for very faint trace of albumin. Stool—one showed very faint trace of occult blood; two negative. Barium meal—plates read as negative.

A gastro-intestinal consultant saw the patient on May 6, 1927, and asked for more laboratory work. On May 13, 1927, he considered a diagnosis of infection or neoplasm of the stomach, and asked for blood culture, which proved to be negative. Further examination of stools for occult blood proved negative.

The patient's temperature varied during his illness from 97 to 103 and the pulse from 70 to 120.

The patient died June 15, 1927.

Clinical Diagnosis:

1. Pulmonary tuberculosis, moderately advanced.
2. Tuberculosis or cancer of the stomach.

Autopsy Diagnosis:

1. Adenocarcinoma of cardia of stomach.
2. Metastasis in wall of stomach and surface of spleen and lymph glands.
3. Tubercles of lungs, liver and in metastasis.
4. Focal necrosis of kidney.

Note—All of our cases with exception of one were sent to the Sanatorium as not having any non-tuberculous complications.

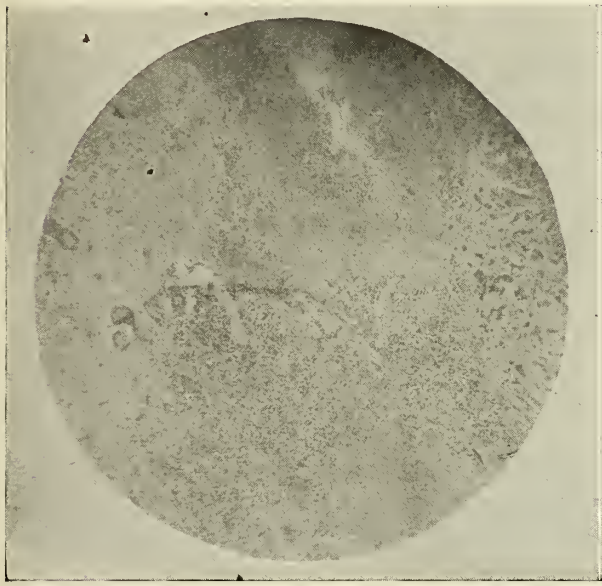

Fig. 5. Microscopic section of tissue from stomach (Case 2) showing: (1) Normal gastric mucosa; (2) Caseous tubercle; (3) Cancer cells.

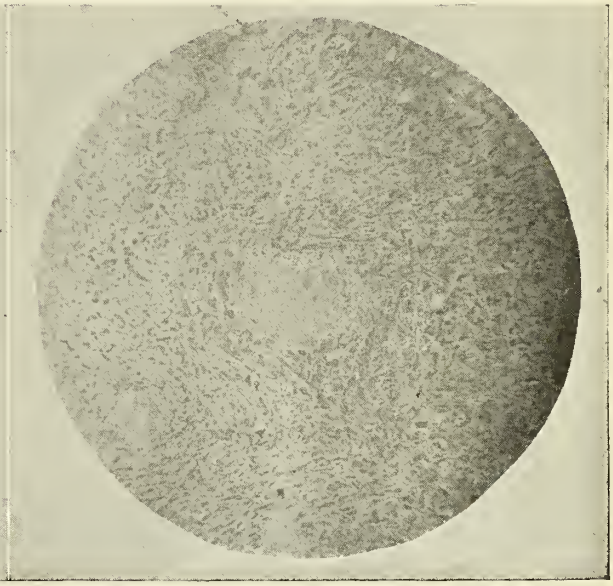

Fig. 6. Microscopic section of tissue from stomach (Case 2) showing a tubercle completely surrounded by cancer cells.

BIBLIOGRAPHY

1. Williams, W. R.: The natural history of cancer, with special reference to its causation and prevention. New York, 1908.
2. Höfer: Zur Kasuistik der Magentuberkulose. Bruns Beitr., Bd. 126, 1922.
3. Bastedo, W. A.: The association of cancer and tuberculosis. Med. News., 85:1166.
4. Bayle, G. L.: Traite des Maladies cancerenses. Paris, 1831.
5. Rokitansky, C.: Uber Kombination und wechselseitige Ausschliessung verschiedener Krankheits—prozesse nach Beobachtungen an der Leiche. Osterreichesse. Med. Jahrb., 1838.
6. Lebert, H.: Beiträge zur Kenntniss des Gallertkrebses. Virchow's Archives, 4:192 (1852).
7. Moak, H.: On the occurrence of carcinoma and tuberculosis in the same organ or tissue. Jour. Med. Research, N. S.-3, 128, 1902.
8. Borst: Die Lehre von den Geschwülsten. Würzburg, ii.
9. Faltin, R.: Tuberculosis plus carcinoma in the stomach. Finska Lakaresallskapets Handlingar 68:659.
10. Centanni, E., and Rezzesi, F.: Tuberculosis and Cancer. Riforma Medica, 42:195.
11. Tice: Practice of Medicine, 11, 475.
12. Simondi, U.: Case of primary cancer and progressive tuberculosis of the same lung. Rivista Di Clinica Medica, 29:255-306.

EPILEPTIC EQUIVALENTS

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WHENEVER the disease epilepsy is brought to the attention of anybody endowed with an average amount of scientific curiosity the question immediately presents itself, "What is epilepsy?" The disease is so common, its clinical manifestations so spectacular, its origin so obscure, and its variations so interesting that the medical literature of the entire world is teeming with theories as to its cause. It would be a physical impossibility to review critically all of these theories in one evening, and inasmuch as none of them can be incontrovertibly proven we will, for the present, pass them by.

In the early days of modern medicine almost every disease accompanied by convulsions was called epilepsy. Brain tumors, syphilis of the central nervous system, uremia, various intoxications, and convulsions due to congenital deformities of the brain, all were included under the general term of epilepsy. As our medical knowledge and diagnostic acumen advanced, these entities were gradually sifted out from the general group until today the diagnosis of essential epilepsy is made only after all other possible causes for the convulsions have been excluded. But, have we yet reached rock-bottom? Is the disease which we now know as essential epilepsy as yet a homogeneous entity? Does it not still include conditions that in years to come will be separated out until the entire group has been divided into entities which will be as well understood as uremia and cerebral syphilis are today? I think this is extremely probable.

A convulsion is the response of an organism to the stimulation of a certain pattern of motility which exists in the brain. This pattern* of motility depends for its design upon the areas of cerebral substance which are functionally active; that is, the type of convulsion produced can be made up only of movements which can be elicited from those parts of the central nervous system which are intact.

Many investigators speak of a convulsive center. This has been defined by Davis and Pollock[1] as "that area of the central nervous system from which a convulsion can be released following a suitable stimulus." In all probability this area is not a true anatomical center but merely a nodal point or physiologic center. According to Davis and Pollock, who have carried out some ingenious experiments, this center is in the medulla oblongata. Furthermore, there is no specific stimulus for this center. From it, convulsions may be liberated by various toxic, mechanical, thermal, and electrical stimuli.

Therefore, what we now regard as essential epilepsy is but a sequence of events produced by the stimulation of a certain physiologic center in the brain by one of a variety of agents. In many cases of human epilepsy this agent apparently is some product of a deranged metabolism. Evidence in support of this belief is adduced by the improvements seen in the condition during fasting,[2] the low basal metabolic rates in a majority of the cases,[3] and the reported alterations in blood chemistry. The convulsive discharge may be evoked also by organic changes in the brain substance: inflammation, tumors, and variations in the pressure of the cerebrospianal fluid. Temple Fay reports pathologic changes in the Pacchionian bodies with disturbed cerebrospinal fluid circulation in many epileptics. In these cases decrease in the number and severity of the fits follows restriction of fluids. Alzheimer has described fibrotic changes in the hippocampal gyrus in a number of epileptics. The only difference between symptomatic and essential epilepsy, then, is that in the former we know the nature of the stimulus to the convulsive center, while in the latter it is not apparent.

Assuming all the foregoing statements to be true, the question might well be asked, "Why do some people suffer from epilepsy while others do not?" The answer to this lies in the fact that the threshold for various parts of the brain varies in different individuals. There is, undoubtedly, a chemical as well as a physical difference between the different areas in an individual brain

as well as in brains from different individuals. We know that in children there is an augmented convulsibility as compared with adults. This is seen in the convulsive response of children to the onset of acute infections, to gastro-intestinal intoxications, overeating, and so forth. As the individual grows older the convulsive threshold rises, and when adult life is reached it is very high. I recently saw a patient seventy years of age who had had epilepsy from the time he was twenty-eight until he was sixty-five. Then, for some reason or another, his fits stopped. In other words, the threshold for his convulsive center was raised to a point above the maximum stimulus that could affect it. In epileptics either the convulsive center is hypersusceptible or the stimuli acting upon it are, as a result of deranged metabolism or organic cerebral changes, of unusual intensity.

The next question to be answered is that of the epileptic personality and of epileptic mental deterioration. I agree with Notkin,[4] who, after examining a large number of epileptics in institutions, believes that the so-called epileptic personality is a result rather than a cause of the disease. This personality is seen principally in individuals in whom the disease appeared at an early age, and always followed, rather than preceded, the appearance of the convulsions. Therefore, I believe that this personality is the result of the convulsions and all their social implications. Because of their affliction the individuals become introspective, egocentric, hypersensitive, and irritable. Their attempted indifference to the scrutiny of the social milieu leads to emotional poverty. In the case of epileptic dementia the deterioration is, in all probability, due to the same organic cerebral change that produced the convulsions (sclerosis, physio-chemical changes, and so forth).

When we come to the question of epileptic equivalents we encounter a somewhat difficult problem. At first glance it appears to be irreconcilable with the theory just presented. Before taking up this question, however, let us define what is meant by an epileptic equivalent. Epileptic equivalent is a state in which the convulsive discharge, instead of taking place at the physiologic level (clonic and tonic muscular contractions), occurs at the psychologic level (episodes of abnormal mental activity associated with corresponding behavioristic anomalies always episodic in nature).

I stated before that a convulsion is the response of an organism to the stimulation of a certain pattern of motility which exists in the brain. In the case of epileptic equivalents this pattern resides at the psychologic rather than at the physiologic level. That this pattern may be activated and the corresponding mental outburst produced by a variety of stimuli is seen in the episodic mental phenomena observed in cardio-renal disease, cerebral arteriosclerosis, eclampsia, brain tumors, and cerebral syphilis.

Our knowledge of the physiology of thought is not yet clear enough to afford an accurate explanation of just what the determinants of this equivalent pattern are. When we know more about the physio-chemistry of brain tissue we may be able to penetrate the veil of mystery shrouding this problem.

Without attempting further to explain the genesis of epileptic equivalents, I wish to report a few cases seen by Doctor Hammes and me during the past few years. Most of these cases were relieved by the usual treatment for epilepsy.

Case 1 was that of a married woman thirty-seven years old with a negative family history. At the age of fourteen she had had several convulsions. At 16, coincident with the onset of menstruation, she had two fainting spells. At 28, just before a menstrual period, she had another. Otherwise she was well until January, 1926, when she had her third child. About three months after the delivery, which was perfectly normal, she began to have compulsive ideas occurring in spells. She had a feeling as if she wanted to seize somebody and harm him. At times this feeling was directed toward her baby, and at others toward her mother. After the impulse the patient would become very much frightened for fear that some day she might not be able to control herself. The patient's mother stated that during the spell her face would become flushed, her eyes staring, and she would complain of feeling sick all over. After the spell she would have a terrific headache for a short time and between spells felt perfectly well, forgetting all about her trouble. A few months after the onset of this trouble the patient began to have typical attacks of grand mal. The physical, neurologic, and serologic examinations were negative throughout. A diagnosis of epileptic equivalent was made, the patient placed on luminal, calcium lactate, and a diet, whereupon the spells ceased. When we last saw her she had been free from spells for over a year.

The diagnosis in this case was based upon the patient's past history, the episodic nature of the attacks, her appearance during them, her well-

being between them, the subsequent appearance of the typical grand mal attacks, and the response to therapy. The only other condition to be considered in the differential diagnosis is major hysteria. This can be ruled out by the absence of any other hysterical stigmata, the well-being between the spells, and the complete absence of any emotional or mental conflicts in the patient.

Case 2 was that of a girl fifteen years old whose father was an alcoholic. The patient's menses were established at the age of fifteen and ceased after her second period. At that time her mother noticed that she occasionally would seem "peculiar" for about an hour. The patient acted as if she were "out of her mind," would strike her mother, talk irrationally, become noisy, and eat a meal in a dream-like state without knowing anything about it. These episodes occurred almost daily and following them the girl could remember nothing about what she did during them. A few months later she had a typical attack of grand mal and continued to have them until her death. The physical, neurological, and serologic examinations were negative. A diagnosis of epilepsy with epileptic equivalents was made but the patient failed to respond to treatment, underwent gradual mental deterioration, and died in status epilepticus at the age of sixteen.

In this case the convulsions occurred in both the physical and the mental spheres. The death in status epilepticus was in all probability due to myocardial failure.

Case 3 (already reported elsewhere by Dr. Hammes[5]) was a ten-year old boy who was seen by us in consultation with Dr. A. A. Meyer, Melrose, Minnesota, on April 12, 1924. One maternal aunt had died of epilepsy and the mother was a somnambulist. During the three years before consulting us the boy had had two attacks of typical grand mal. Three weeks before we saw him an employe on his father's farm had frightened him and the patient fainted, remaining unconscious for about three minutes. Following this he felt very tired for a while. A few hours later when the boy saw the man again he had another fainting spell, following which he became acutely disturbed, running about, biting, scratching, and tearing various objects to pieces. Since that time at varying intervals and without any provocation whatever the boy would go through the same performance, becoming violent, trying to jump out of windows, striking people, and so forth. If left alone he would quiet down in a few minutes but remember nothing of what had happened. Physical and neurologic examinations were negative throughout. The patient was put in a sanitarium for observation and treatment, and during the five months that he was there had several attacks of grand mal as well as numerous equivalent attacks. However, these subsided under treatment for epilepsy and the boy returned home, where he has remained well ever since.

In the above case a psychic stimulus liberated the motility pattern at the psychologic level. That the pattern also at the physiologic level can be activated by the same sort of stimulus is seen in the fact that many epileptics have spells following some fright, an argument, or some other severe emotional strain.

Case 4 was that of a married woman thirty-four years old who was seen by us on June 1, 1928, in consultation with Dr. F. C. Schuldt of St. Paul. A maternal aunt had migraine and one sister was subject to peculiar choking spells which the patient was unable to describe accurately. Ever since she herself could remember, the patient had been subject to migraine. Six years before consulting us she had had eclampsia and albuminuric retinitis. Since that time she had been having spells characterized by an extraordinary tingling sensation over her entire body, usually lasting for several minutes. Along with this sensation there always was much gas in the lower abdomen and severe cardiac palpitation. Friends have told the patient that during the spells she always trembled and became very pale. The spells came on at intervals from once a week to several times a day, and they occasionally awakened the patient at night. They frequently followed the ingestion of candy or rich food. Five weeks before we saw her the patient had had a typical attack of grand mal lasting four minutes. The neurological, physical, and serologic examinations as well as the basal metabolic rate revealed normal findings. A diagnosis of epileptic equivalent was made and the patient responded to therapy.

The diagnostic features of this case were the family history, the low threshold of convulsibility as indicated by the fits accompanying the pregnancy, the patient's appearance during the attack, the fact that the spells awakened her at night, the attack of grand mal, and the response to therapy. Hysteria is ruled out by the nocturnal occurrence of some of the spells.

Case 5 was that of a single woman, thirty years old. Her family and past histories were irrelevant. For three years before consulting us she had been subject to peculiar spells occurring only at night. They never were associated with a dream and always would awaken the patient from a sound sleep. She would suddenly jump out of bed and run into the next room in a state of extreme terror. During the spell her face was very pale and the pupils dilated. After the spell her left arm would always feel numb as far up as the shoulder and remain so for about an hour. She never slept on her arm. There always was an amnesia for the attack. The physical and neurological examinations were negative. A diagnosis of nocturnal epileptic equivalent was made, the patient placed on 1.5 grains of luminal at bedtime, and the attacks ceased.

Here the diagnosis was based principally on the nocturnal occurrence of the spells. As stated before, hysteria rarely, if ever, will awaken a patient from a sound sleep.

Case 6. A married woman aged 28 was seen by us on February 1, 1927, in consultation with Dr. Arnold Schwyzer of St. Paul. Her family and past histories were negative. Three months before consulting us she began to have spells characterized by marked weakness, emotional depression, mild confusion, and unmotivated fear. About fifteen minutes before each spell she had a herald consisting of a peculiar sensation of numbness involving the entire body. During and sometimes after each attack, which lasted for several minutes, the patient had a severe headache. Her husband stated that during the attacks she frequently said and did peculiar things although she never remembered anything about them. Upon one occasion she arose in the morning apparently well. A few minutes later the family observed her coming down stairs in her nightdress saying that she was going out. At another time her people found her rocking back and forth in a chair, fondling an old coat, and saying that it was her baby. She finally took the coat to bed with her but remembers nothing of the episode. At another time she attacked her father and had to be subdued by force. Always during the spells she had a frightened, staring expression, and afterward complained of a headache. Physical, neurologic, and serologic examinations were negative. A diagnosis of epileptic equivalent was made, and after a rather tedious convalescence the patient was free from attacks.

The attacks in the above case were either hysterical or they were epileptic equivalents. The absence of any emotional conflicts, the patient's freedom from all worry, her happy family life, and the absence of all other hysterical stigmata, led us to the latter diagnosis.

Case 7. A married woman aged 32 was first seen by us in March, 1927. One brother was subject to fainting spells, two maternal aunts and two maternal uncles had "nervous breakdowns," and the patient and one sister had had migraine for many years. One year before consulting us, while her husband was chasing her in a game of "tag," she suddenly became hysterical, screamed, cried, and ran aimlessly around for about ten minutes. She then became entirely normal but had a total amnesia for the episode. She felt sleepy for a short time but continued with her house work. Three or four times after that the patient "went to pieces" over inconsequential things. She always repeated the same performance as during the first attack. Physical, neurologic, and serologic examinations were negative and the diagnosis rested between major hysteria and an epileptic equivalent. Upon questioning the patient closely it was found that she had been subject to fainting spells ever since childhood. While these were not typically of the grand mal type, they had several aspects which were very suggestive of so-called essential epilepsy. The spells disappeared under luminal therapy and diet.

Here we have a case in which the psychic equivalent always was conditioned by an emotional stimulus. It is conceivable that if thought is a physio-chemical process, the changes in the brain incident to certain degrees of excitement might activate a pre-existing motility pattern.

Case 8 recently came under my observation in the Neurologic Clinic of the Wilder Dispensary. It is that of a fifteen-year-old girl whose parents were addicted to drinking, immorality, and dishonesty. The father had served a penitentiary sentence for burglary and the mother had, in the meantime, an illegitimate child with gonorrheal ophthalmia.

At the age of nine, because of the unsatisfactory home environment the patient was put in an orphanage. Nothing unusual occurred until about two years ago when she was found at the dining table crying. On being questioned as to the cause she stated that she had a severe headache and did not care to eat. The Sister in charge suggested that she go to bed. She left the dining room and instead of going to the dormitory walked down stairs. The Sister followed her and found that the child was in a dazed condition and was unable to find her way to her bed. She spoke incoherently and apparently did not understand anything that was said to her. She was put to bed and was later found sitting on the floor near her bed crying. When she finally went to sleep she slept profoundly and in the morning felt well and acted normally. A similar "scene" has been enacted at intervals of about five weeks. Since the first spell the Sisters have noticed that the patient is unusually "dreamy."

In questioning the child she has stated that she has had three bad headaches but has suffered no other pain. She said, "I don't know what I am doing when I have one. I can't understand what Sister is saying, though I know that she is trying to tell me something."

The Sisters who saw the patient while she was in this state say that the color left her face, and that she became very haggard and drawn looking. There was no noticeable twitching and no frothing.

She was referred to Dr. Max Alberts of this city, who placed her on luminal and referred her to the Neurologic Clinic, where I saw her in February, 1929. The neurologic and serologic examinations were negative throughout. She stated that as long as she took her medicine she would be free from spells, but if she neglected to take the luminal the spells would recur.

The above case is undoubtedly a pure epileptic equivalent. All organic causes for the condition have been ruled out and the extremely bad family history together with the episodic nature of the attacks and the response to therapy substantiate the diagnosis.

CONCLUSIONS

1. Our present concept of essential epilepsy probably still includes entities which in the future will be separated out from the group and considered as different diseases.

2. It is probable that the entire group some

day will be split up into well-defined clinical entities.

3. What we now regard as essential epilepsy is but a sequence of events produced by the stimulation by one of a variety of agents of a certain physiologic convulsive center in the brain.

4. This agent may be anything from products of a deranged metabolism to fibrotic changes in certain brain areas.

5. The threshold of convulsibility varies in different individuals. It increases as the individual grows older.

6. The so-called epileptic personality is the result rather than the cause of the convulsions.

7. An epileptic equivalent is a state in which the convulsive discharge occurs at the psychologic rather than at the physiologic level.

8. The pattern of motility for epileptic equivalents lies in the mental sphere, while that for ordinary epilepsy lies in the motor sphere.

REFERENCES

1. Davis, L., and Pollock, L.: Experimental convulsions. Arch. Neurol. and Psych. XX, 756, October, 1928.
2. Lennox, W., and Cobb, S.: Studies in epilepsy. The clinical effects of fasting. Arch. Neurol. and Psych. XX, 771, October, 1928.
3. Lennox, W., and Wright, L.: Studies in epilepsy—the basal metabolism. Arch. Neurol. and Psych. XX, 764, October, 1928.
4. Notkin, J.: Is there an epileptic personality make-up? Arch. Neurol. and Psych. XX, 799, October, 1928.
5. Hammes, E. M.: Some phases of epilepsy. Minn. Med., Dec., 1924.

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*"The pattern theory is not a spiritistic one that assumes an appearance of energy from an extramaterial sphere, but merely claims that exhibitions of energy in the biological field may be given their direction by agencies not subject to physico-chemical laws." John T. MacCurdy in "Common Principles in Psychology and Physiology," MacMillan Co., Cambridge, England, Page 11.

MOUTH WASHES AND DENTIFRICES

Nowhere is scientific thought and even honesty more disregarded than in the pseudobiochemical propaganda inseparably connected with the exploitation of dentrifices and mouth washes. Consider for instance what advertising writers are pleased to term "acid mouth." It is well known but not often admitted in the propaganda of certain dentifrice manufacturers that the P_H level of the saliva is maintained regardless of the material introduced into it. Dentifrices of both acid and and alkaline nature are sold with the claims that they will correct all sorts of supposed conditions in the mouth. Many of the alkaline dentifrices, presumably designed to correct mouth acidity (which in a sense is the normal condition), are especially blatant in their announcements. If an abnormal acid or alkaline condition is present in the mouth, there is probably an underlying constitutional cause which should have the expert attention of physician and dentist. Sooner or later, manufacturers of dentifrices will have to heed the results of scientific investigation. The chief purpose of a dentrifice is to clean the teeth, or, more practically, to establish a healthy habit. The balance of evidence is against the view that dentifrices can be used for so-called mouth correction. (Jour. A. M. A., March 16, 1929, p. 899.)

MEDICAL PRESCRIPTIONS OF ALCOHOL

During 1928, 68,951 physicians used prescription books as contrasted with 48,097 in 1927. The number of licensed physicians in those states which permit the use of liquor for medicinal purposes is 116,756, so that a little more than one-half the total number of physicians permitted to prescribe alcoholic liquors avail themselves of the opportunity. Slightly more than 10 per cent of all the physicians who might prescribe alcoholic liquors used the total number of prescriptions afforded them by the government. The total number of prescriptions issued during the year increased from more than eight million in 1922 to approximately thirteen and a half million in 1925 and then decreased to less than twelve million in 1927. At the close of the year the number of outstanding permits of this kind had increased to 101,052. (Jour. A. M. A., March 30, 1929, p. 1130.)

VACCINES FOR PREVENTION OF MENINGITIS

The use of vaccines for the prevention of epidemic meningitis has not been extensive enough to establish any definite general medical opinion in regard to its value. (Jour. A. M. A., March 23, 1929, p. 1008.)

COMPLETE TEMPORARY PHRENIC NERVE PARALYSIS*

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PHRENIC nerve paralysis occurring in the course of disease in the chest has only begun to be recognized since the advent of common fluoroscopy and plating of chest diseases. The physical signs are such that in the absence of chest disease there is no difficulty in recognizing this condition. However, in the presence of pulmonary or mediastinal lesions the signs resulting from paralysis, complete or partial, of one phrenic can be easily ascribed to the existing lesion rather than to the true cause. An absolute diagnosis can only be made by fluoroscopic examination of the chest.

There is no doubt but this condition occurs much more frequently than is commonly supposed or recognized. In the texts and systems of medicine, if it is mentioned at all, it is given merely a line, saying that it has been known to occur. The only paper on the subject that we have been able to find is that of Sir Charlton Briscoe in The Lancet. In a report on thirty cases of this syndrome he states that the last fifteen cases observed by him have been seen in the last year. It would therefore seem to us that this condition is at least one of the common rarities accompanying intrathoracic disease, and that the number of cases seen will bear a direct ratio to the number of patients in which it is looked for.

The popularization of phrenicotomy in the treatment of lower lobe tuberculosis is at the present time giving publicity to the signs that accompany the blocking of the phrenic nerve. The question will be raised whether it is theoretically possible for inflammatory or malignant structures in the mediastinum to exert sufficient pressure upon the phrenic nerve to cause a blocking of the impulses descending along it to the diaphragm. In experimental work on this, Briscoe has found that the less pressure applied the longer it will take to act, but that it will eventually act, and he concludes: "The results in general show that the pressure necessary to cause paralysis varies inversely with the duration of application. The amount of pressure exerted by pathological conditions on the phrenic nerve during life is not known. Since, however, the smaller pressures used in these experiments are comparable with the diastolic pressure in an artery, and were found effectual, the pressure only acting for the short time allowed for the experiment, we can assume that growths, glands, or fibrous tissue, acting over much longer periods of time, can easily exert sufficient force to block nerve impulses."

*Read by invitation before the medical staff of the Lymanhurst Hospital School, Minneapolis, Minn., September, 1928.

PHYSICAL AND ROENTGENOLOGICAL SIGNS

On inspection of the chest it will be noticed that the side affected has a diminished excursion on inspiration. Further, on close examination it may be frequently demonstrated that the costal angle moves upward and inward on deep or on normal inspiration, in contra-distinction to the opposite one which moves downward and outward. Furthermore, careful inspection of the interspaces in thin chested individuals will sometimes reveal that these are retracted during inspiration. At times the entire chest will appear to be asymmetrical, namely, the affected side will seem to be smaller. However, all these signs may, with the exception of the retraction of the interspaces, occur in other and more common pathological conditions. It does not seem to us that the single sign of interspace retraction is present in a sufficiently marked degree to form, for the most of us, at least, a symptom upon which we can with assurance make the diagnosis. Palpation will confirm what we have observed by inspection.

Percussion of the affected side will reveal a moderate degree of dullness, about the amount that would be in keeping with a markedly thickened pleura, or a small amount of pleural exudate. Again, pleural exudate is without doubt much more common than phrenic nerve paralysis. Further, it will show posteriorly that no movement of the diaphragm can be demonstrated. This again is a frequently observed sign due most

commonly to either lower lobe disease at the diaphragmatic surface or to hydrothorax.

Auscultation reveals diminished or absent breath sounds, with no pectoriloquy or bronchophony. This again is most commonly found in the case of a thickened pleura or a small amount of hydrothorax.

Flat or stereoscopic plates of the chest will show the underlying trouble, and in addition will reveal that the diaphragm is unusually high on the affected side. This should give us a very definite hint as to the possibility of phrenic paralysis. If the case is then fluoroscoped, and the observer has sufficient confidence in his observations, his report will include the statement that the diaphragm of the affected side is situated in the fourth or fifth interspace and reveals the pathognomonic sign of phrenic involvement, namely, that on ordinary respiration, when the opposite dome descends, this side of the diaphragm ascends higher in the chest. This can only occur in the case of phrenic paralysis. The mechanics are relatively simple: when the normal diaphragm descends, it exerts a negative pressure throughout the thorax, and as the affected half of the diaphragm acts as an inert membrane, it will mechanically attempt to compensate the movement of its other half by rising further into the chest. This is ideally simple, but like most other things in medicine there is a catch in it. In most cases of this kind the paralysis is not absolute and if the observer asks the patient to take a real deep inspiration he will be surprised to observe that instead of the unusual movement of the diaphragm it will either remain stationary or else it will move slightly downward. This is best explained in one of two ways. Either an especially deep respiration is accompanied by a sufficient contraction of that portion of the diaphragm not innervated by the phrenic (the part near its costal attachment) or, what according to Briscoe is more likely, the increased stimulus on the phrenic nerve as the result of the deep inspiration is sufficient to overcome the physiological block, with the result that the usual impetus to contraction arrives at the diaphragmatic muscle.

OCCURRENCE

This condition can occur with anything causing an enlargement in the upper part of the mediastinum. The most frequent cases are probably malignancy, syphilis, benign glandular enlargements around the base of the lungs, aneurysm, and tuberculosis. The part that glandular enlargements play in the etiology can not but make the observer speculate as to the probable frequency of tuberculosis playing a rôle. The only case of tuberculosis causing this, however, is included in Briscoe's series. In Sir Charlton Briscoe's series, the causes were as follows: six had syphilis and no other demonstrable lesion; one case was due to aneurysm and was confirmed at postmortem; three cases were due to primary glandular enlargement, two of which came to postmortem; in twelve there was a primary growth in the neighborhood of the base of the lung, confirmed by postmortem in ten; seven were due to secondary deposits of malignancy from a primary growth elsewhere and all were confirmed by postmortem examination; one case was due to tuberculosis of the mediastinal glands. The single case that we have seen was without doubt due to glandular enlargement as the result of a streptococcic pneumonia.

CASE REPORT

L. O., white, male, aged 30, was admitted to the Lakeview Memorial Hospital on March 1, complaining of pain in the right lower quadrant, nausea, malaise, and pyrexia. Physical examination at that time revealed a small area about 3 cm. in diameter in the right chest corresponding to the upper part of the right lower lobe posteriorly, in which could be heard râles and pectoriloquy. Examination of his abdomen revealed increased tone in the right rectus muscle and tenderness over the cecum. A diagnosis was made of right bronchopneumonia, with the possibility of recurrent subacute appendicitis (patient gave a history very suggestive of former attacks of appendicitis). On account of the pulmonary findings it was decided to defer operation, and the patient was given only fluids by mouth, and an ice cap applied over the region of the cecum. His course in the next ten days justified our actions. His pneumonia spread so as to involve the entire right middle and lower lobes, there was the production of a bloody purulent sputum, in which only streptococci could be seen on smear, and the abdominal symptoms became quiescent by the end of the first week of hospitalization. After the first two weeks, his temperature began to fall and his pneumonia ceased to spread. He was confined to the hospital for an entire month, largely on account of the fact that his chest failed to become clear, and he continued to run some temperature. Eventually his temperature became normal and he was discharged, dullness and râles still remaining over the entire right lower chest. At his first visit to the office, about a week subsequent to his

discharge, it was found that the chest findings were unchanged. It was noticed that at this time there was a complete absence of movement of his right side, and that his right costal arch, if it moved at all, moved inward and upward on respiration. He was fluoroscoped and it was found that there had been little resolution in his lower lobe, and that in addition the diaphragm was abnormally high, and that it moved upward instead of downward on deep inspiration as well as on ordinary breathing. He was told to eat well, sleep long hours, and stay in the open as much as possible, and to do no work. He returned in another ten days, feeling much better, and examination showed that there was a downward movement of the diaphragm on deep inspiration, though it still moved upward on normal breathing, and that the lower lobe had become much more penetrable to the rays. He returned a month later feeling excellent and at that time his chest was practically clear and the movements of his dipahragm were normal.

DISCUSSION

An interesting point in this case is the question of what part the paralysis of the diaphragm had on the slow resolution of the pneumonia. It seems very likely to us that the paralysis of the diaphragm and the subsequent lack of normal aeration in the lower part of the lobe accounts for the slown resolution.

REFERENCES

Briscoe, Charlton: The diagnosis of unilateral nerve paralysis. The Lancet, ccviii, 376 (Feb. 21), 1925.

Briscoe, Grace: Unilateral Phrenic Paralysis. The Lancet, ccxi, 56 (July 10), 1926.

THE QUESTIONNAIRE NUISANCE

One of the many by-products of the modern art of advertising is the advertising agency, whose business it is to prepare advertising campaigns for those who wish to cry their wares in the market places. Out of the business of preparing advertising campaigns has grown one of the most intolerable nuisances that ever plagued the medical profession—the questionnaire. The fault rests primarily on those members of the profession who, with easygoing tolerance, give, for the asking, expert opinions that are based on much work and special study. Some of these questionnaires come frankly from advertising agencies; others, although also emanating from advertising agencies, are camouflaged with names such as "research" or "bureau." The following are some of the questionnaires with which the medical profession has been plagued during recent years: Lord and Thomas, advertising agents of Los Angeles, sent letters to dermatologists in the interest of the California Fruit Growers Association on the effects of lemon juice when used as a hair rinse. Lord and Thomas and Logan, New York, circularized physicians in the interest of the manufacturers of "Lucky Strike Cigarettes." Williams and Cunningham, an advertising agency, went to the profession seeking advertising data on asthma and hay fever. Physicians received a questionnaire from "The Editors" of the *Medical Review of Reviews*, addressed to dermatologists, regarding a survey of methods of washing the hands to insure freedom from skin diseases, preservation of line and contour, etc. The National Research Bureau of Cincinnati (a fancy name used by Procter and Collier Co., an advertising agency) also sent out a questionnaire to dermatologists. A questionnaire was sent out by the "Medical Research Bureau" of New York, dealing with the use and prescribing of sedatives, the data to be used by John B. Daniels, Inc., Atlanta, Ga., makers of Pasadyne. A questionnaire was sent out by the "Medical Research Bureau" of Chicago in regard to a profit-sharing method of supplying drugs in quantities direct from the wholesaler. Physicians should consign to the wastebasket every questionnaire that asks for free advice and comes from commercial or unknown sources. (Jour. A. M. A., March 23, 1929, p. 1004.)

BLOOD PRESSURE VARIATIONS IN SEVENTEEN NORMAL WOMEN*

ESTHER M. GREISHEIMER, ELISABETH MERRILL and HELEN LYNCH
Minneapolis

SINCE many reports of blood pressure determinations have been based upon one observation on each individual, made under rather unfavorable circumstances (without attention to physical condition, previous activity, psychical condition, etc.), we thought it worth while to make frequent determinations upon the individuals of a group of women over a period of several weeks. The observations were made during October, November and December, 1928. The women were students in the University of Minnesota, between eighteen and thirty-seven years of age, and in good health. All of the readings were made by two of the authors. Observations were made at one o'clock, and again at five o'clock, on the same afternoon, whenever possible. The students were brought into a quiet room, two at a time, and the pressure determined in the reclining position after about five minutes rest. They then stood, and the standing pressure was determined after about three minutes.

The means and standard deviations were found by the usual statistical methods. Since there were seventeen indivduals on whom observations were made at various times, and since blood pressure may vary from individual to individual, or from day to day in the same individual, it is probable on *a priori* grounds that two blood pressure readings made on the same individual at two different times, or in two different positions, on the same day, will be correlated. In determining the probable error of the difference between the mean blood pressures† in the reclining, R, and standing, S, positions, we therefore use the formulæ

$$\varsigma^{2}_{(R-S)} = \varsigma^{2}_{R} + \varsigma^{2}_{S} - 2r_{RS}\,\varsigma_{R}\,\varsigma_{S} \text{ and}$$

$$E_{(R-S)} = .6745\,\varsigma_{(R-S)}/\sqrt{N}$$

From the actual data we found that the correlation between the systolic pressures in the reclining and standing positions, $r_{R_1S_1}$, (to be discussed later) was .821, and $r_{R_5S_5}$ was .824. Likewise, the correlation between the reclining systolic pressures at one and at five o'clock on the same day, $r_{R_1R_5}$, was .620.

On the seventeen individuals, 176 observations were made in each position at one o'clock, and 113 at five o'clock. The results are presented in tabular form, the probable error of the difference in both systolic and diastolic pressures being determined by the above formulæ.

	One o'clock	Five o'clock
	Mean Systolic Pressure	
Reclining	114.43 ± .54	115.13 ± .62
Standing	112.98 ± .49	112.26 ± .58
Difference	+1.45 ± .31	+2.87 ± .36
	Mean Diastolic Pressure	
Reclining	70.14 ± .31	72.52 ± .36
Standing	75.10 ± .32	77.79 ± .36
Difference	—4.96 ± .33	—5.27 ± .40

Nine of the women reported at one and at five o'clock on the same day a total of 77 times. The results were as follows for the reclining position:

	Mean Systolic Pressure	Mean Diastolic Pressure
1 P. M.	112.14 ± .71	68.83 ± .41
5 P. M.	112.66 ± .71	72.14 ± .40
	+.52 ± .62	—3.31 ± .53

A study of the relationship between the systolic pressures in the two positions at one o'clock gives a correlation coefficient, $r_{R_1S_1}$, of .821 ± .017, in which, as above stated, R is the pressure in the reclining position and S the pressure in the standing position. The linear regression equation, calculated from the means, standard deviations, and correlation coefficient, is $S = 28.19 + .74\,R$. The empirical mean standing systolic pressures for each class of reclining pressure are plotted on the scale of ordinates against the reclining pressures in Graph 1. The relationship between the systolic pressures in the two positions at five o'clock is measured by a coefficient, $r_{R_5S_5}$, of .824 ± .020. The linear regression

*From the Department of Physiology, The University of Minnesota.

†All pressures are expressed in mm. Hg. The following designations are used: R_1—pressure in the reclining position at one o'clock; R_5—at five o'clock; S_1—pressure in the standing position at one o'clock, S_5—at five o'clock.

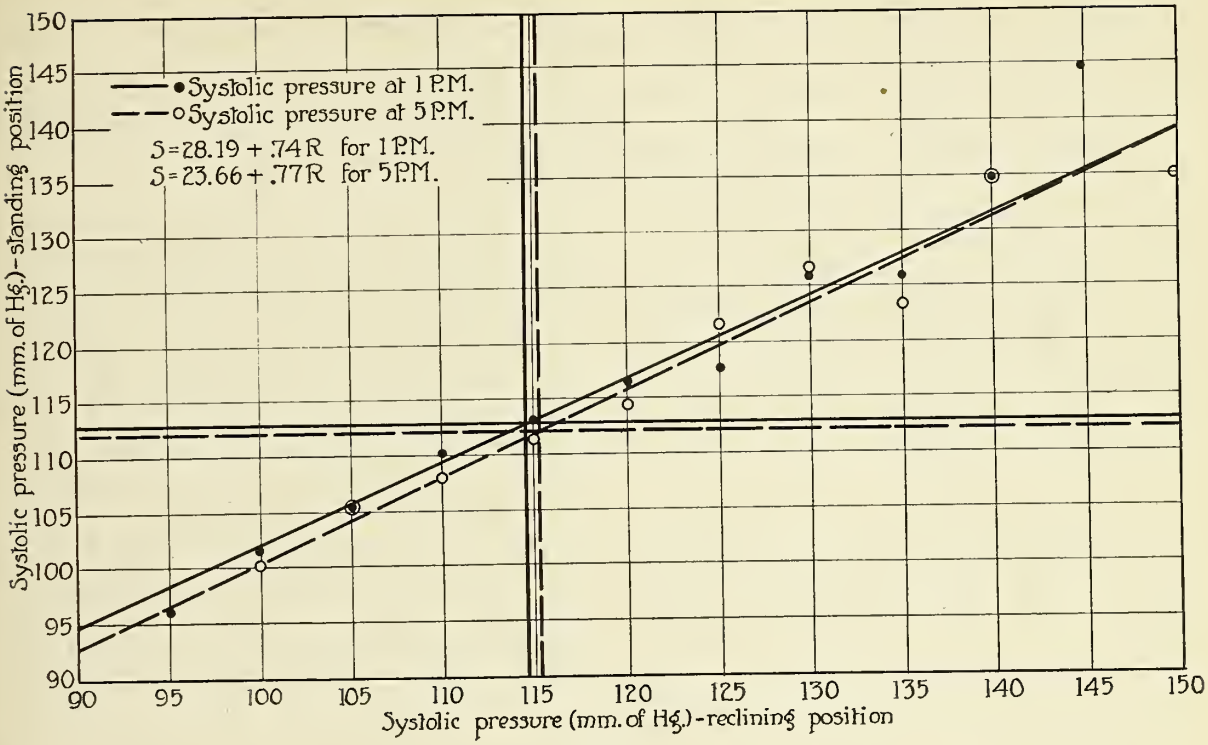

Chart 1

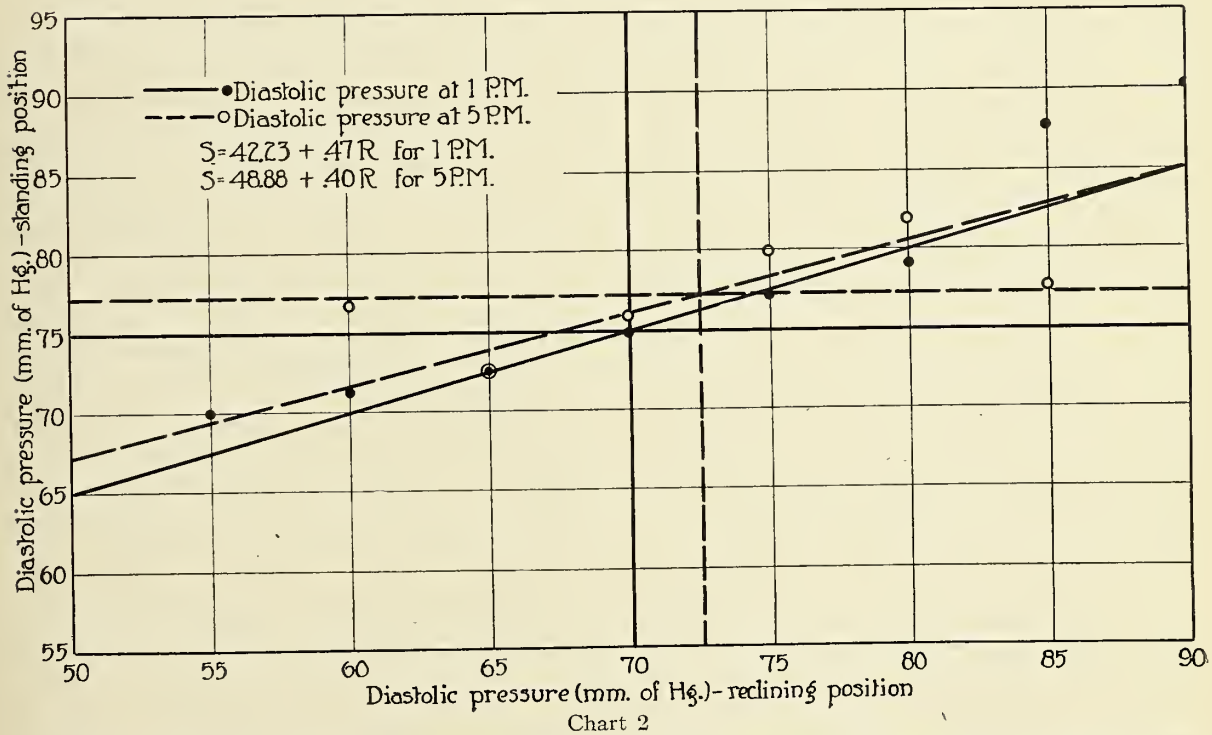

Chart 2

equation is $S = 23.66 + .77\,R$. The results are laid beside the results for one o'clock in Graph 1. The regression lines for the two series are essentially identical.

The relationship between the diastolic pressures in the two positions at one o'clock is expressed by a coefficient, $r_{R_1S_1}$, of $.450 \pm .040$; the linear regression equation is $S = 42.23 +$

.47 R. The results found for five o'clock are a coefficient, $r_{R_5S_5}$, of .396 ± .053, and a linear regression equation of S = 48.88 + .40 R. Graph 2 presents these results.

The systolic pressures in the reclining position at one o'clock are related to those in the same position at five o'clock on the same day as measured by a coefficient, $r_{R_1R_5}$, of .620 ± .047. The diastolic pressures in the reclining position at one o'clock bear little relation to those in the same position at five o'clock on the same day. This is expressed by a coefficient, $r_{R_1R_5}$, of .138 ± .076.

CONCLUSIONS

1. The mean systolic pressure is significantly higher in the reclining position than it is in the standing position, within the time limits previously given.

2. The systolic pressure in the reclining position is correlated closely with that in the standing position.

3. Mean systolic pressures in the reclining position were found to differ by insignificant amounts between one and five o'clock on the same day.

4. The mean diastolic pressure is significantly lower in the reclining position than it is in the standing position, within the time limits previously given.

5. The diastolic pressure in the reclining position is not closely correlated with that in the standing position.

6. The mean diastolic pressure in the reclining position is significantly higher at five o'clock than at one o'clock on the same day.

We desire to express our gratitude to Prof. J. Arthur Harris for valuable criticism in the preparation of the manuscript.

We are also grateful to the students who made this study possible.

PUBLICITY AND THE PRESS*

Arnold Daane
Editor of the Austin Daily Herald
Austin, Minnesota

I AM afraid I am going to speak on a subject that is a tender spot among the medical men. Mr. Brist said something about the ease with which you may obtain a license for massage. I have no such license, but in massaging this tender spot, I hope I am not going to rub the fur the wrong way.

Publicity paints mental pictures. I had such a picture painted for me when I was in a tender age. There was a picture of a doctor, and I presume no matter what I read, I will always have that picture in mind; possibly you have seen the same picture—a painting which twenty-five years ago was in the homes of every town. The title was "The Doctor." It showed a child lying upon a cot of rather a humble home, undoubtedly the home of a poor man, certainly not that of a rich man, and a woman sat with an apron covering her teary eyes. There was, too, an old gentleman—and always that gentleman will be to me a picture of the medical profession. That old gentleman was a comforter, and I always regard the doctor as a comforter. I presume a lot of families have seen that picture, which I know my grandmother handed down to my aunt, who gave it to my sister. That picture was publicity. I imagine if you should say that to the painter, he would be offended. The picture is idealistic, it paints a picture of things as they should be, yet that picture gives you no impression of a medical man as a scientist. It doesn't give you a picture of a medical man setting fees and conducting the audit of his account, or, for that matter, coping with a problem of publicity. You don't find it in that picture. That picture is the true picture—the publicity for the doctor as a whole. A doctor doesn't object to publicity as a whole, but to individual publicity.

But there is other publicity, of enlarging your acquaintances, and between the time that a doctor first puts himself in his chair without a patient, and the time when he is a successful practitioner, there has been some publicity operating in the meantime. Now, it would appear that it is newspaper publicity the medical profession picks as objectionable. But there are other means of publicity. I can remember sitting in a moving picture theatre in a small town, looking at a picture on the screen. There all the art of the movie director had been put on that screen to arouse the emotion of the people sitting in the theatre. They are waiting for a story to unfold, and just before the climax is reached, in walks an usher, "Is Dr. Smith in the house?" Possibly you have heard that. Now, an advertising man would recognize that as exceptionally good publicity. Here you have five to seven hundred individuals, their emotions aroused, they haven't heard a word spoken for possibly hours—they will pause in their interest in the picture to wonder about the poor devil who needs Dr. Smith.

As a reporter, too, I have occasionally discovered something else. Feeling that I might overlook a story, I have slipped to a telephone, and found there was no need for calling Dr. Smith. Other times I dashed madly to the hospital or other designated spot, and found there no need for the doctor.

Surely a physician needs publicity. It isn't merely his medical profession for which he is responsible. He is also responsible for his individual success. I don't know what is supposed to constitute good medical publicity. If a physician is successful and someone tells it to someone else—word of mouth publicity is all right. I can't admire you gentlemen very much for relying on rumor as a type of publicity.

There is something about human nature that demands either news or publicity. If the newspaper doesn't print it, rumor will get it, and, to tell the truth, rumor hasn't been very kind to you gentlemen—not nearly as kind as newspapers have. I have to go back in our newspaper file a long way to find one where my paper said anything really mean about an individual doctor. In our town a resident was walking along the

*Address given before the Conference of Secretaries of the component societies of the Minnesota State Medical Association, St. Paul, Feb. 23, 1929.

street, and suddenly had an attack of apoplexy. Several people saw him fall. There was a young doctor starting out in his profession, and they rushed and called him out, but the man was beyond medical attention, and he died a few moments after the attack. The newspaper printed the account, and printed the name of the Doctor, but said—"The Doctor gave him some medicine, and in a few moments he was dead." Now that's mean. I have to confess that, but I have heard rumored a lot meaner things. I know, because in the newspaper profession rumor is pretty much a competitor of news.

I remember a rumor about a physician in our town, which I as a layman could readily have explained. There seemed to be an epidemic in town of a disease which broke out on the face. This doctor, I presume, prescribed something like mercurochrome and he put it on the spots on the face of the patient, which appeared to have a pretty good effect. One patient would go to him and get some results, and someone would notice it. In a little while this doctor had quite a number of patients. That doctor was putting his advertisement on the face.

You seem to insist upon referring to publicity in a news story. The stock story man isn't particularly anxious to quote the name of a doctor insofar as that is mere publicity. He knows that his subscribers aren't sitting anxiously waiting to find out what doctor attended a case. But there is a reason why he does put it in. First, he gets his price attached to a good news story. The price of this story may mean more than the story can afford for a column of news. And it may mean printing the name of a doctor in connection with a story. We are dependent upon tips in getting a good story. We are dependent upon the physicians to help put that news together. If he printed the name of a doctor in connection with a story, he has more chance of getting a news article.

We have had little accounts come into the office from doctors' offices, and the name of the doctor in connection with the comments, with the request that we use them just as they have been written. Now, I don't know how you think we diagnose this objection. We have our own explantation. We feel it is the Medical Association, not the individual doctor, that objects.

There is a good rule that says "the whole is greater than any of its parts." This is true, but we are not responsible for the whole, and we have to deal with the parts, because we are relying upon them to furnish us with a certain type of news. But, as I said, I never heard a doctor object to publishing his name in an account in a good news story. I have heard doctors complain, possibly not openly, about the name of some other doctor in connection with a news story, and I presume that we are left to assume that it is a matter of distribution; that the newspapers don't show any equality in allotting your publicity. I think that is something that is hard to remedy. As a newspaper man I realize that in connection with a newspaper story there is doubtless publicity. I realize that publicity has been a by-product of that news story, and it is very much like healing and paying. Now, you can't equalize news stories and publicity in news stories. Publicity and news don't fit in the same dimension. They are like two boards of unequal lengths.

Some people have a knack of getting more publicity than others; just as some people have a knack of getting more of anything else than others. It merely happens that way. You gentlemen, as practitioners, know that man is not created to remain equal.

There is a certain type of case that does make good news, the industrial case or the accident case. That situation will always exist. Another trend that will demand more publicity in the future is the general interest in health. We are becoming more interested in health than we used to be. We talk health, we read and eat health, and in this age of short nights and long days, some of us even sleep health; and a newspaper, recognizing that extended scope of news, is going to indulge more in the matter of health. More daily newspapers and more weekly newspapers are publishing medical columns, or health columns as they call them, and in that the names of physicians are quoted quite frequently, because the names of physicians do mean something too in news contributions. That is one phase.

There are medical men who have added to the achievement of medical science. Where a man is nationally known in the medical profession, he is always locally known in his town. What happens in a community is of just as much importance to the community as a thing that happens in a nation is to the nation. I believe that

community will become closer knit if the community newspaper gives the local people the full share of their due.

I know of two or three incidents that happened in our snowbound district, where there was something in the nature of heroics performed, to people that needed medical attention. You people possibly take that as a matter of routine. The doctors said nothing to me about it. I think that sort of thing is something that may interest the people. It might give added publicity to and added understanding of your profession. I don't know why we couldn't get together on this sort of thing. In your Association you appear to stress the doctor, rather than a doctor; to stress medical science and the medical profession, rather than the individual practice of a member. We are not in position to rob the doctor of his individuality and weight of news, and I presume we never will. I haven't anything to offer by way of suggestion. I feel that there is going to be news about medicine and about doctors, and in connection with this news there is also going to be publicity.

We were sent a rather peremptory notice from our local medical society. It was rather brief, merely requesting us to refrain from publishing the names of physicians and also the name of the medical society. I didn't happen to be personally connected with the incident, but my partner reacted with about two columns, with the names of all the physicians carefully inserted. I believe there was not one name omitted. It wasn't so much a matter of freedom of the press on which we insisted when we wrote that two column article; it was merely a matter of community interest. We feel in our little community we have to do something to keep it on a par with the larger communities. We print the names of eminent physicians. We print their standing, their utterances and we would like to understand why we shouldn't print the name of a local physician. I really don't think that a resolution, directed to the press, is going to do a great deal of good. They possibly can do something in the matter of keeping objectionable publicity out of the paper. Possibly resolutions might do something to eliminate the quacks. Possibly the newspaper is making duck soup out of quacks. But I think we are going on just the same, and I imagine all newspapers will go on just the same in printing the doctor's name. We haven't much to offer at any rate, as a solution of the problem, but we have something to request—we might ask that you gentlemen be more liberal in giving your names to the newspapermen.

President's Letter

THE PUBLIC HEALTH NURSE

A short time ago a committee of the society appointed by the Council met with a group representing the State organization for public health nursing. Many interesting facts were brought out regarding the public health nurse and her relation to the community which she serves, as well as to the physician in her district. Modern methods have transformed the old type of visiting nurse into the present day public health educator, whose function is largely that of demonstrating to those whose privilege it is to serve, how to keep well rather than as an aid to recovery from illness.

Just as soon as a community understands and appreciates her attitude she is of necessity a welcome visitor. It must be understood, however, that in addition to a thorough nurse's training, she must have the ability to intelligently and impressively present to her people the simple facts of hygiene and right living in such a way that they will carry conviction and be properly acted upon. She should also stress the importance of medical examinations and the early and prompt resort to medical aid in even what may seem at first to be only trivial indisposition.

The properly trained public health nurse neither attempts to diagnose nor prescribe but is ever ready to assist in carrying out the doctor's orders and to instruct and aid in every way where help is needed.

According to expert opinion there should be approximately one public health nurse to 2,000 population in order to meet the community health needs adequately. In Minnesota there is one nurse to about 3,000 people in the urban sections. In the rural communities there is one nurse to approximately 24,000. It is obvious that the emphasis of development in public health nursing should be in the rural areas. There are 38 counties in Minnesota that have no public health nurse of any kind. There are 61 counties with no county-wide nursing service. There are 392 public health nurses in the state today, but only 120 are outside of the cities.

Results are largely measured in terms of improved personal and community hygiene, better health habits, correction of defects, reduction of prevalence of communicable disease, etc. In response to a questionnaire sent to Superintendents of Schools, a year or so ago, all of those who replied spoke in favor of the school nursing service and pointed out the accomplishments along health lines which were made possible by the service. Dr. J. A. Meyers, President of the M. P. H. A., who has coöperated very frequently in the conduct of clinics throughout the state, has often said that a large degree of the success of the clinic depended upon the efficient preparation, assistance, and follow-up of a qualified public health nurse. A study in New York City showed that only 6% of the school physicians' recommendations were carried out before the introduction of the school nurse. With their help this percentage was increased to 80 per cent.

May we venture the hope that the time is not far distant when a more thorough and complete understanding of the public health nurse and her activities may bring about a greater coöperation among school authorities, social service groups, and the medical profession in Minnesota?

THE CONSULTATION BUREAU

The impression that this bureau would consist of the committee named in the President's letter of last month has given rise to some misunderstanding. It should be clearly understood that this group is merely a sub-committee working with Dr. O'Brien and Dr. Meyerding in developing the details and plans of administration.

The Consultation Bureau is an enterprise fostered by the Medical Educational Committee of the State Association and now has an extension course faculty of approximately three hundred specialists and it is the plan of the committee that this group will furnish the nucleus of a consultation staff for the Bureau although Dr. O'Brien will feel free to call upon any member of the Association for an opinion.

EDITORIAL

MINNESOTA MEDICINE

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STATE MEETING

Seven outstanding speakers from out of the State, a scientific program one half day longer than a previous meetings, an Open Forum luncheon for the public, a medical economics session of unusual interest and importance, and excellent entertainment and exhibits are features of the sixty-first annual meeting of the Minnesota State Medical Association to open at the Masonic Temple, St. Paul, May 13.

Headlining the program are the following out-of-state speakers: Dr. Elliot Proctor Joslin, Boston, Professor of Medicine, Harvard University; Dr. George P. Muller, Philadelphia, Professor of Clinical Surgery, University of Pennsylvania; Dr. William Engelbach, Endocrinologist, formerly with Washington University, St. Louis, now on leave of absence to write a book; Dr. Arthur L. Chute, Associate Professor, Genito-Urinary diseases, Tufts College, Boston, Mass.; Michael M. Davis, Ph.D., Chicago; Dr. Morris Fishbein, Chicago, Editor of the Journal of the American Medical Association; Dr. Kellogg Speed, Chicago, Associate Professor, Clinical Surgery, Rush Medical College, and Dr. G. A. Skinner, Surgeon, U. S. Medical Corps, Fort Omaha, Nebraska.

To make possible an additional half day of scientific program, the Ramsey County Medical Association has arranged for clinics opening at 8:30 A. M. Monday, May 13, followed by a luncheon at which the Ramsey County Society will be host to delegates. Details of the clinics will be found in the program printed elsewhere. The Council of the State Association will convene at 10:00 A. M. on the opening day in the Blue Room of the Masonic Temple, and the House of Delegates will meet in the afternoon.

A request Clinic on Fractures, the choice subject of the majority of physicians of the State according to a post-card ballot, will start Monday P. M. at 1:45, opening the State scientific program. A fine symposium covering various phases of the subject has been arranged.

Cost of medical care, a topic of vital interest to every physician, will be the theme of the Medical Economics meetings Monday night. Dr. E. A. Meyerding, Secretary of the Minnesota State Medical Association will preside at this session, which will be held in the Masonic Temple auditorium, starting at 8 P. M. Speakers include: Michael Davis, Ph.D., Chicago, who under the Julius Rosenwald Fund is making a thorough study of this subject, Dr. Morris Fishbein of the American Medical Association, and Dr. O. E. Locken of Crookston. Review of legislative work in Minnesota will be given by Dr. Herman M. Johnson, Dawson. Members of the Women's Auxiliary will present a skit, "Better Halves," the cast of which has been chosen from people

with stage experience. All physicians and their families are urged to attend this meeting.

Dr. Elliot Proctor Joslin, of Harvard, will lead a symposium on diabetes, which will open promptly at 8:30 A. M., Tuesday. Dr. Joslin will start the session with an illustrated lecture on "Treatment of Diabetes."

Dr. Chas. H. Mayo of Rochester and Dr. Joslin will lead the discussion in the symposium on goiter schedeuled for Tuesday afternoon. Dr. Mayo will take the surgical phases of the subject, and Dr. Joslin the medical.

To give the public an opportunity to hear the visiting speakers an Open Forum luncheon meeting will be held at the St. Paul Athletic Club at 12:30 P. M. Tuesday. Speakers will include Dr. G. A. Skinner, Surgeon Seventh Corps Area, U. S. Medical Corps, Fort Omaha, Neb., Dr. Charles Mayo, and Dr. Joslin. It is expected that many physicians will attend this luncheon.

Few speeches and much entertainment are promised for the banquet meeting Tuesday night. Dr. R. C. Farrish, Sherburn, will be toastmaster, and brief talks will be given by the State President, Dr. J. T. Christison, St. Paul, and Mrs. Ben Davis, St. Paul.

A large and worthwhile display of scientific and commercial exhibits have been planned for the meetings. Among those presenting scientific exhibits are the Minnesota State Board of Health, the University of Minnesota and the Medical School. Noonday movies are an additional feature of the program.

Program of the Women's Auxiliary will start Monday afternoon at 2:30 with a meeting of the Executive Board. Entertainment features for the visiting physicians' wives are being planned by the Ramsey County Auxiliary.

Stating that the scientific program for the sixty-first is one of the best in the history of the organization, officers urge that every physician who can possibly arrange to attend the sessions, do so.

THE HEART COMMITTEE OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Owing to the striking increase that has occurred in the death rate from cardiovascular disease in this country during the last twenty years and owing to the fact that the problems of heart disease have been so emphasized during the last few years, the Minnesota State Medical Association appointed a committee to investigate the problem of heart disease.

These problems are numerous and the Committee perceived that it must proceed with caution; therefore, an attempt has been made to formulate a plan of approach. The coöperation of the medical profession in the state was necessary to success and it seems that since the Committee is an integral part of the State Association full coöperation can be anticipated.

In many states the problem of preventive cardiology has been taken up in various ways, some of which have been commendable and others of which are subject to serious question. In some states the problem of preventive cardiology has been undertaken by lay organizations. In this state it has been felt that until a more definite manner of approach has been determined control of the situation should remain in the hands of the medical profession.

Preventive cardiology must confine itself largely to the coming generation, as there is probably relatively little opportunity to accomplish much along these lines among adults of the present generation. Definite vital statistics in Minnesota are necessary and if they are to serve as a basis of further study a uniform nomenclature of heart disease is needed. Only by these means can the mass of collected material be accurately analyzed on an etiologic basis, and etiology is the crucial point in analysis of vital statistics.

The Committee plans on making available to the various county and district medical societies, speakers who will give talks on the various problems relating to the subject. This phase of the work will be carried on in conjunction with the Extension Division of the University of Minnesota.

It is planned to present a cardiac exhibit at the coming meeting of the Minnesota State Medical Association in St. Paul. The Heart Committee will be glad to have any member of the State Association submit material that could be used in making a comprehensive exhibit. Dr. Douglas Head, Donaldson Building, Minneapolis, is Secretary of this Committee and any communication dealing with the Heart Committee should be addressed directly to him.

THE HEART COMMITTEE.

PHYSICIANS' INCOME SURVEY

From time to time one hears statements about the average income of physicians. Some of these estimates are ridiculously low and some fantastically high. There seems to be a very general idea that physicians never need to worry about their incomes and as a result the physician's bills are frequently the last to be paid. As a matter of fact, no comprehensive survey of the question has ever been made and the statements made are mere opinions.

A survey published by *Medical Economics* (March, 1929) gives the results of 1,000 questionnaires returned by physicians scattered all over the country. From this survey the average income is placed at $5,806 with an average practice of nineteen years. The net incomes show variations from $3,284 in rural districts to an average of $7,125 in metropolitan centers, the increase keeping pace with the size of the community. The expense of practice showed a corresponding increase from an average of $2,445 in rural practice to $4,357 in cities of 50,000 and upward, the figures being slightly less in metropolitan centers than the highest figure (centers of 50,000 and upward). As is to be expected, the ratio of specialists to general practitioners increases within the larger centers of population and the incomes of the specialists average higher than in general practice. A thousand questionnaires is scarcely a large enough number to make the survey satisfactory.

A study made by the Alpha Kappa Psi fraternity for the year 1926-1927 entitled "The Relation of Education and Income" is interesting reading. The conclusions drawn from nearly 8,000 returned questionnaires are that by the age of 60 the high school graduate has earned $88,000 on the average or $24,000 more than the man without high school education, which makes the high school training worth $30 a day. Likewise the college graduate by the age of 60 has earned $144,000 or $56,000 more than the high school graduate, which would make each college year worth $14,000. From this survey, the average man at 45 with only an elementary school education earns $1,700 a year; with two years of high school, $2,000; and with four years of high school, $2,600. With returns from only 141 lawyers and fifty-eight physicians the conclusions drawn are scarcely justified.

The survey being made of physicians' incomes by the A. M. A. is national in its scope and should give an accurate picture of the actual income and expense of practice in this country.

We have yielded to the temptation to make a similar survey of the incomes of physicians in Minnesota. Unless there is a general coöperation on the part of members of the Association no reliable conclusions will be forthcoming. We shall attempt to determine mainly net incomes and the present day expense associated with practice. Care should be taken in filling out the form not to include automobile expense, for instance, if it is not used for practice. Every physician has figures for his 1928 income tax at hand and although one is loath to fill out any unnecessary forms, members of the Association are urged to coöperate to the extent of filling out the questionnaire which appears on page xxvi (advertising section) and returning it unsigned to the office of the journal. A few returns have already been received following the publication of the questionnaire in the journal last month. Duplicates, of course, are not desired.

HISTORICAL COMMITTEE

Do you know, or do you remember, the first medical journal published in Minnesota? Who was the editor and publisher? How many different journals have been published in our State? Well, we know about them, and have seen and read some of the contributions in them, and they are interesting too. We would, however, like to know more about the "Minnesota Medical Mirror," published from 1881 to 1885 in Cambridge City, Minnesota. We have one copy only. The editor and publisher was Nerius M. Cook, M.D. We heard that he went to Duluth after he left Cambridge. Can't some of you men in Isanti County give us some information? Heretofore we have been honest enough to ask only questions we could ourselves answer; now we are giving you a chance. Local Sherlock Holmes will please get busy. Our fountain pen is not dry yet. Can you stand more?

To conclude, and again stress the main point, Dr. H. M. Workman, Tracy, Minnesota, will be the recipient of all information you may send in.

J. M. A.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

It has frequently come to our attention that various local and state associations pass resolutions asking recognition by other groups. Many insurance companies, railroads, industrial concerns, etc., have as a requirement or give preference to the members of organized medicine.

We are publishing two letters, one sent out by a State Medical Association and the other a reply from a large insurance company. While we do not agree with the insurance company in every respect, nevertheless, it calls to our attention certain facts that you will remember when we consider topics of this character.

"At a recent meeting of the Executive Committees of the ..... State Medical Association the subject of Medical Examinations of Life Insurance applicants came under discussion. Among other things it was brought out by one physician of the group that at present a great many examinations are being made by physicians who are not identified as members of the County, State, or American Medical Association.

"Inasmuch as the most scientific and progressive men in the medical profession are members of their State Society, and inasmuch as it is fundamental with the Insurance Companies to have their medical examinations made carefully, thoroughly, and honestly, and inasmuch as both the Insurance Companies and the Medical Associations have much in common in the interest of the public's welfare, we feel at liberty to ask you to take under advisement this error in coöperation.

"After consideration of this matter I hope you will be able to inform me so I in turn may notify the rest of the membership, that in the future all Medical Examiners for your company will be appointed from the membership roll of the ..... State Medical Association."

My dear Dr. .....:

"Your letter addressed to the Secretary of this Company under date of January 29th has been referred to me. I assume that this is a form letter which has gone out to all insurance companies doing business in the state of .....

"In order to make our position clear to you, I am glad to inform you that wherever we can find a man who is otherwise qualified and who is a member of the County, and State, and American Medical Association, we always give him preference in our appointment. We do this because we feel that the better men are much more apt to be in the legitimate and recognized medical association.

"However, I am sorry that a letter of this kind went out to all of the insurance companies as I very much fear that it will make a very unfavorable impression upon them as regards the propriety of such action by the State Association. Your Committee practically makes a demand upon insurance companies that they should employ no other men in the State of ..... than are represented in your organization.

"As sincerely interested as I am in perfecting the organization of the medical profession, I think a demand of this kind is a mistake and will be more apt to antagonize a business organization than to obtain their coöperation. You infer that all of the honest and competent physicians of the State of ..... are members of the State organization. I wish very much that this was true, but I doubt if it is true for any of the State organizations. We certainly could not commit ourselves to the definite assurance that we would never use a physician who was not a member of the ..... State Medical Association, and I believe that on reconsideration you will agree that this is not a proper request to make of us.

"Suppose, for example, we were doing business in a town in which there was no member of the ..... State Medical Association practicing medicine. Should we therefore withdraw from that territory? Suppose, for another example, we had found that our regular appointee, who was a member of the ..... State Medical Association, was rendering us either incompetent or dishonest service and we had to discontinue him and the other practitioner in the town was not a member of the State Association, what course would then be open to us?

"If you will refer to the last edition of the American Medical Directory, and run down the first column of ....., you will note that there are four towns in the first column under 'A's' in which no practitioner in those four towns is a member of the State or American Medical Association. In the second column, there are five towns and I assume that probably a somewhat similar proportion throughout the state.

"I am intensely interested in seeing the physicians of the country and respective states thoroughly organized, and, as a matter of fact, I am a member of the Committee in the ..... State Medical Association which you represent as Chairman in ..... However, I do not like to see the profession take a method which might be misinterpreted as smacking too much of trade union methods. I fear the reaction of such methods from the point of view of the public, and especially business houses, would be inclined to prejudice. them against the organized profession rather than impress them favorably.

"I trust you will pardon this frank expression of personal opinion."

MISCELLANEOUS

REPORT ON ANNUAL CONGRESS ON MEDICAL EDUCATION, MEDICAL LICENSURE AND HOSPITALS*

E. L. Tuohy, M.D.
Duluth, Minn.

It was my privilege to attend the conference of the American Medical Association on Medical Education, Medical Licensure and Hospitals, held in Chicago, in February, 1927. I attended as the invited representative of our State medical association, and at the suggestion of the then acting president, W. F. Braasch. This year I attended because of certain responsibilities on the program. I was again impressed by the unusual earnestness shown in the various sectional programs; the deep and serious work of the American Medical Association and its officers; the large number of men who yearly travel such distances in order to exchange ideas and determine our most useful administrative procedures. At that time I summarized some of the discussion and published it in Minnesota Medicine. Most of the papers read are ultimately published in the Bulletin, but since a good many do not read this valuable brochure it seems worthwhile to review again for our readers this meeting.

LABORATORIES IN HOSPITALS, IN PRACTICE AND IN MEDICAL TEACHING

Hans Zinsser, M.D., Professor of Bacteriology and Immunology, Harvard University Medical School, Boston, stated that the enormous increase in objectivity in diagnosis has greatly emphasized the position of the laboratory (term used in its broadest sense), and according to the writer and Wilbur, there has been not a little distortion. The suggestion obtrudes that impersonal clinics may displace the individual. However, the present issue seems to be to develop those who may correctly interpret the objectivity, which is the product of all laboratories.

Raymond Pearl of Hopkins is quoted as having stated, "America likes both its high ideals and its liquor; it proclaims temperance with the former and encourages bootleggers with the latter." In some such manner, a rich country is said to be able to afford whole-time teachers and researchers. In any case, they sense the danger in a plan which may have as a by-product the creation of "medical mechanics." Zinsser, who states that he is "not a radical but a violent modern," wants our students in medicine to know the fundamentals and to grasp the principles of logic. He asks teachers even in science to lose some of their "syntax grinding and pedantry." He asks the public to know enough of medical science to know that "the islands of Langerhans" are "not in the South Pacific!"

As to the much mooted question as to how laboratory men (pathologists—and the same applies to roentgenologists) shall be suitably and sufficiently rewarded: certainly he maintains that they must be men of vision—not "Methodists in a wine cellar—incurious and perfectly sober!" Neither should they be "trained seals—taught to ring a bell, for which they are given a herring!" To have capacity for teaching research and correlation they must have contact with scholarly minds; "the beginner must be taught, not by the dilettante, but by the very wisest; automatous routine stifles not only individuality but useful output."

One speaker had another plan to aid researchers: "It may be needed in America to teach our heiresses to marry scientists instead of dukes." A word of caution was extended to those entering salaried positions anywhere—beware of "blind alleys—leading no place in particular, and, as far as professional activities are concerned, fostering activity developing the individual for capacity or use only in some very specialized environment or unusual connection." Dr. Rappleye again stated that fully 50 per cent of the graduates of our Class A schools enter into salaried positions.

In the conference on radiologic laboratories, much attention was given to the professional position and the emolument or financial return due the radiologist. The hospitals, their superintendents and managers, came in for a great deal of criticism because of their attempts to dictate, direct, and possibly exploit, the roentgenologist, or to use the department to build up their revenue. In any case, the right kind of a man greatly increases the value, the output and the utility of the hospital department. The same can be said, of course, of those in other departments, like pathology, physiotherapy, etc.

"There are indeed few pathognomonic signs; any one exclusive interpretation may be unsafe." One is left with the feeling that they deserve support and that they are entirely willing to establish the kind of cooperation that reasonable doctors want.

Dr. P. M. Hickey of Detroit presided at the special radiologic session.

The very well known Dr. James T. Case of Battle Creek, in discussing the papers of Dr. A. U. Desjardins of the Mayo Clinic, Dr. Charles L. Martin of Baylor hospital, Dallas, Texas, and Dr. Wm. E. Chamberlain of Stanford University hospital, San Francisco, Calif., stated correctly that the papers were "quite masterpieces."

Desjardins pointed out that in the period following 1895, when Roentgen made his first announcement, there has been a rapid scramble, with much evidence of the same distortion in application of the science, as was commented on by the other speakers in the realm of laboratories in general.

In discussing the nomenclature—use of terms (skiagraphy—roentgenography—radiography)—it was pointed out that the use of radium following Becquerel and the Curies left a certain amount of uncertainty. These two forms of rays have kept farther apart than their common properties justified.

Everyone commented upon the absolute need of more thorough organization of x-ray work in practice and in

*Meeting held February 18–20, 1929, at Palmer House, Chicago, Ill.

hospitals, and the need of coöperation between roentgenologists and other specialists. (See editorial, MINNESOTA MEDICINE, April, 1929, p. 226.)

Another question was introduced in terms of the work of roentgenologists in hospitals and the application of ultra-violet light. Having entered upon this field of the use of the ultra-violet light it is only obvious and natural that the directors of the *x*-ray laboratories must have certain contacts with other forms of light treatment not necessarily having notable penetration powers. The usual "hocus pocus" of physiotherapy was mentioned. "*X*-ray men must not live in a world of shadows; any announced *x*-ray specialist should have good grounds for his announcements. Up to date the state and federal governments have no mechanism to safeguard and keep up to a certain standard all men entering specialties, so in the meantime each group must keep its own house clean." He might have said that this is the great work of many of our special societies. It is easy to see that anyone practising as eager, vivid and dynamic a profession as ours must constantly "make up his hand," even as the good "Rummy" player must do.

Many shortcuts in our approaches must be devised; we must not allow precedents to keep us from revamping our schemes either for research, for routine diagnosis or for coöperation. If good men are going to come into roentgenology, however, they must see a career before them equal to that in other associated lines. Apparently these men hold strongly to the feeling that "few internists and surgeons know the possibilities of roentgenology."

Charles L. Martin, speaking of equipment, stated that the recent transactions of the conference at Stockholm had an excellent résumé on the question of protection both of the operator and the patient. This should be consulted. While technicians may be able to do a good deal, they are certainly not competent in the judgment of films, and should never trifle with fluoroscopy.

It was suggested that in each hospital each radiologist bring together "a museum of films especially designed for teaching purposes and reference." It is obvious to him that a great deal of improperly ordered *x*-ray work yields no useful purpose. Few roentgenologists are well trained in the matter of therapy. Like the pathologist, they must be able to teach, to stimulate interns to take part in conferences.

Dr. Chamberlain discussed without heat the growing invasion of commercial laboratories, and stated unqualifiedly that their success and development depended entirely on other practitioners of medicine. We should not ask for laws to keep out these commercial laboratories, but we should expect the profession of medicine to "keep its own house clean." There can be no equivocation on this point. Some of the reasons given for the development of these laboratories are the failure of the average doctor to value the consulting capacity of the roentgenologist, or his general dislike to consultations in general. Probably some might state that there were no available high grade and well trained men. Many hold, however, that the use of *x*-ray is entirely "a series of technical procedures." "Some blame the system of charges, and think that mere photographs made of celluloid "should be charged for by the square inch."

Professor Wm. A. O'Brien, of our own University, dealt with the subject of clinical hospital laboratories most effectively. He indicated the growing concept of the term "pathologist," and made it clear that it covers a wide series of efforts, both in clinical medicine, in teaching and in hospitals. Certainly it has outgrown the dead house, and has come to include much that is physiology. It should not be split up unduly into regional zones or segments.

In presenting his ideas of what a qualified pathologist should be able to do, he brought out the following:

1. He should be able to do a good necropsy and make a good report upon it. In the matter of time, choosing a place for the work, and having others present with him, as well as in general principles of technic, it was his belief that the whole matter should not be lackadaisical, indifferent, done in a slovenly manner or without system.

2. In the matter of surgical tissues, it was his belief that the very widest experience was essential, and in giving reports on tumor tissues, exudates, etc., it was not beyond the province of the pathologist to indicate broadly certain principles pertaining to therapy and prognosis.

3. The pathologist should be able and willing to briefly abstract clinical histories, and file them away with the autopsy reports—a virtual "synopsis of all the chapters in the life cycle of the disease." Except in certain unusual circumstances, a report should be sent to the family.

4. The pathologist should have the broadest concept of bacteriology, and be able to deal with the technic and with the general subject intelligently.

5. In addition, he must have contact with biochemists or have good technicians available who have been trained by them. This is essential "unless much of our clinical application of the newer physics and chemistry is entirely misapplied."

6. He should be able to handle successfully, to teach and coöperate with "morticians." The details need not be added here.

7. Finally, he should have some research ability—"he should not be the solemn, introspective type, but should have the instincts of scientific advancement and interest in its methods."

He showed a curve of the percentage of autopsy permits, based upon the type of man in different hospitals, his health, his initiative, and the extent to which he has grown into his job. This curve is most instructive.

He commented at some length on their course for technicians, now tried over a four-year period in Minnesota. They have seventy-seven young women now enrolled. These "practitioners of medical technic" are being very well received, and at a time when women are yearning, searching about and investigating, in order to find the place for their talents, this field is worth considering.

8. While we are discussing the question of hospital cost, laboratory needs and proper supervision, we should not forget that "doctors need a good deal of instruction as to the proper way to use the laboratory." We might say the same regarding any other hospital facility.

Dr. Ralph Kinsella of St. Louis, well known on account of his researches on arthritis, its bacteriology and experimental course, continued the discussion on hospital laboratories. His comments dealt chiefly with "the control and support of hospitals and their laboratories largely catering to private physicians." He pointed out that the early efforts of the American College of Surgeons in its standardization program did much to eliminate the risk of private patients in private hospitals. He went into the question of the minimum requirements of the American College of Surgeons, and wished to draw attention to the expansion in these minimum demands or requirements that would be proven to be worthwhile:

1. He would ask for a certain additional clinical examination of the blood—also for a Wassermann reaction.

2. He would ask for a routine *x*-ray of the chest, with natural emphasis upon the heart and lungs. He pointed out that where this was done a very definite increase in the diagnosis of pulmonary tuberculosis (50 per cent) had occurred over that in a similar hospital where this routine was not considered. Certain heart lesions—unexpected—were also uncovered.

They have experimented with varying flat rates for not only laboratory hospital work but also for certain roentgen work. They began with a flat laboratory rate of $5.00 but he felt that the rate could be reduced, and presently for the obstetric department it was $2.50.

In the establishment of all these rates there was at first a considerable complaint—usually from the doctor, and rather rarely from the patient. Now nearly everybody accepts it without question.

The result of these flat rates and far more routine work, has helped everybody "to appreciate the obligation of the hospital toward its patients; to do for them more than was actually demanded; to elevate the hospital in the opinion of the average practitioner; to provide a source of education to the staff; to help in training and orienting its interns; and, most of all, to obtain the confidence of the public."

Of course the plan has called for a considerable increase in the number of technicians, but, on the other hand, it has greatly decreased their bookkeeping and collection difficulties. In general, the routine *x*-rays of the chest have yielded more surprises than have the routine tests of the blood. In both the clinical and the roentgen laboratories no additional burdens have been imposed, despite an increase of 50 per cent in the work.

In the past, something like 30 per cent of the people have paid for 60 per cent of the laboratory work—the flat rate tends to accomplish a more equitable distribution.

THE PROBLEM OF EDUCATION

Many critics observe that technic in education has had little consideration in medical schools. David A. Robertson* did not make this statement, but directed his paper to an analysis of the three great professions and how they are recruited. Harry Emerson Fosdick, in referring to his own group, is quoted as stating that those in Theology today "seem to desire to live in an unchanging world." Truth in any form need not be feared by any religionist. The fear is with mounting costs for all professional education that incompetency, backed by money, may get in, while genius hustles to live in lines of common labor. Can worthwhile intelligence tests be applied? Robertson feels that "achievement tests" as worked out at Georgetown University promise more.

Louis B. Wilson, of the Mayo Foundation, in reviewing the results of "careful quadrennial examinations" of five hundred men at the Foundation, finds that there was a definite relation between the ratings of these men in their various medical schools in terms of the four primary branches of Anatomy, Physiology, Physiological Chemistry and Pathology. However, while fifty-one medical schools were represented, no one school seemed to have grounded all of its men equally in all four of these branches; some excelled in one, and some in another. In the various other branches and departments there seemed to be no correspondence with later accomplishments whatever. Thus it is seen that, while much standardization of medical schools has taken place, much individuality still exists.

Speakers from Albany (including Thomas Ordway, Dean of the Albany Medical College) described the individualistic efforts put forth by them to develop the type of student who will later be satisfied with life in rural communities. This feature is stressed in the choice of the students admitted; in the final year of their course they are sent out for informal instruction with general practitioners of good standing. They are said to retain an interest not only in rural life but in rural medicine. Courses are to be offered at Albany for their graduates aimed to keep them up to date.

This may, in some degree, answer the criticism of Dr. McCormack of Kentucky, who states that "the Class A medical schools are turning out Lincolns and Pierce Arrows, whereas the country as a whole needs more Fords and Chevrolets!" He pointed out that "sixty counties in Kentucky presently have no doctors under fifty years of age." A Texan stated that graduates of Class A medical schools remained in his state only long enough to seek a salaried position. In any case, and in all states, this matter of the farmer—his good roads and better car—have a bearing on the life of the doctor and the type of practice left for him. The farmer has come to know the possibilities of medical science, and the answer must likely be well managed and functioning smaller hospitals in all of our smaller cities.

HOSPITAL CONFERENCES

The problem of keeping our doctors up to date at a time when our concepts are so rapidly changing brings

*Asst. Director, Council on Education, Washington, D. C.

into review the pivotal position of the hospital. Despite the fear of some of our county and state societies that hospital conferences, reviews and staff meetings may detract some interest from them, observing physicians agree that there is at this time no constantly available opportunity for graduate study for the physicians engaged in practice in all lines better than the present day weekly and monthly hospital meetings.

Dr. D. C. Ensign (reading Dr. Sladen's paper) spoke for the work in the Henry Ford hospital at Detroit.

It was interesting to hear such statements as the following—"Our two weekly meetings are made a forum for the sharpening of medical wits—a school in ethics —an opportunity for the older men to mold, critize and develop the younger." And note this important technical comment: "We find time for discussions of 'the King's English—medical history—general morale—deviations from the normal—a survey of material for research and comments on the proper presentation of material to more formal societies."

The hours of meeting must, of course, depend much on local conditions. However, too few hospitals, it seems to me, give sufficient attention to the great advantage of an early morning hour—either 7:00 to 8:00 or 8:00 to 9:00 a. m. One doctor complained bitterly because most of his meetings evidently occurred in connection with an evening, and with the intermingling of anatomical specimens with the dishes he had been quite driven to become a vegetarian!

INTERNS

As usual, the speakers were solicitous, caustic or dismayed at the attitude of many interns. A friendly man suggested that "all teachers expect the intern to become as proficient as they are themselves in their own limited line."

Another thought that instead of having a rotating service it would be better if the intern put all his time in one department, on the basis that if he were more highly trained in one branch it would be better than a casual look at many!

At Harvard they have found it advantageous to teach the third and fourth year men to make yearly examinations upon themselves and the rest of the student body. This work, done under the supervision of the medical department, not only gives them valuable teaching, but excellent information regarding themselves.

Studies made at Cornell, it appears, would indicate that the health of the students retrogresses as they approach their final and fourth year. Whether this came from overstudy, too little exercise, dissipation, or otherwise, was not stated.

Many would agree unqualifiedly with Dr. L. B. Wilson that medical students of today likely are not taught sufficiently, "about useless things"—art, music, history —the basis of useful avocations. Indeed, I am led in contemplating the all-important matter of a proper choice of men for medicine, to quote from Joseph Collins.

"A man to be greatly good must imagine intensely and comprehensively; he must put himself in the place of another, and many others: the pains and pleasures of his species must become his own." We may well ask with the author, "Is the aspirant for a position in our profession such a man; can he develop such a personality; is he able to assist in the creation of a public opinion whose momentum will wipe out self consciousness, crush out prejudices, destroy self righteousness, and purge us of our besetting sin: a subordination of the universal to the individual?"*

Glenn Frank's recent discussion on "Adult Education" also comes to mind.

The interns of today are the practitioners of tomorrow. Like our children, they copy our actions and deeds; they pay little attention to our words. The problems of our hospitals, like those of life in general, are never solved. We must, with Einstein, sense a universe in which Time interposes a factor, shattering our sense of fixity. No sooner have we adapted ourselves to a régime than the régime itself changes, dissolves, or presents sufficient new angles to call for all degrees of readjustment, even up to those that are revolutionary. We should, therefore, be wise enough and just enough to anticipate something of the situations that are constantly arising. In this manner our adaptation is gradual, and revolutionary changes are not so apt to find us "with the concrete totally set," and with our adaptability quite lacking. and with the stage set for all those glorious "misunderstandings" that render life as complex as it is inscrutable.

It is freely stated that many physicians are unhappy, unsuccessful and dissatisfied because their personality fabric was not such that they could ever slip noiselessly into a useful niche, either in their profession or into any community where they seek to live. Each man must find a place for himself. He must have a chance to support his family. He should be in possession of enough common sense to avoid speculation, to husband his resources, and to live a reasonably calm and dispassionate life. We should not blame either Fate or our calling for our own unsocial traits or cultural inadequacies.

*From Shelley's "Defense of Poetry," quoted in Joseph Collins' book, "The Doctor Looks at Marriage and Medicine."

MINNESOTA DEPARTMENT OF HEALTH, DIVISION OF VITAL STATISTICS

Gerda C. Pierson, Director

1928

Diseases		Deaths	Rate (per 100,000 est. pop.)
*Heart Disease		4102	150.70
*Cancer		2896	106.40
*External Causes:		1989	73.07
Automobile Accidents	407		14.95
Railroad Accidents	123		4.52
Accidental Drowning	169		6.21
Accidental Poisoning	45		1.65
Other Accidents	853		31.34
Homicides	57		2.09
Suicides	335		12.31
*Pneumonia		1799	66.09
*Nephritis		1464	53.78
Tuberculosis (All Forms)		1459	53.60
Pulmonary Tuberculosis	1219		44.78
Other Forms Tuberculosis	240		8.82
*Influenza		1083	39.79
*Diabetes		512	18.81
Maternal Deaths		261	9.59
Puerperal Sepsis	89		3.27
Other Deaths in Puerperal state	172		6.32
*Diarrheal Diseases of Children—(Under 5 years)		210	7.71
*Syphilis		146	5.36
Whooping Cough		83	3.05
*Alcoholism		78	2.86
Diphtheria		73	2.68
Scarlet Fever		64	2.35
Epidemic Encephalitis		72	2.64
Acute Anterior Poliomyelitis		57	2.09
Epidemic Cerebro-spinal Meningitis		49	1.80
Measles		13	.48
Typhoid		12	.44
*Gonorrhea		5	.18
Smallpox		0	.....
Total above causes		16,406	
Deaths all other causes (exclusive of 1,464 stillbirths)		9,563	
Grand Total		25,969	
General death rate per 1,000 estimated population			9.54

Estimated State population—2,722,000

The above table is being published for the information of our readers. Any vital statistics contain admittedly some element of error, probably as a result of difference of opinion among members of the profession as to the actual cause of death, as well as to errors in diagnosis. Nevertheless, it is evident from the above that heart disease heads the list by a wide margin and the efforts being directed by such agencies as the Heart Committee of our Association (mentioned in an editorial in this number of the journal) in an effort to cut down the present figure are fully justified. For the first time tuberculosis has fallen to sixth place as a cause of death, it having fallen to fifth place in 1923.

The additional data submitted by the State Board of Health are also of interest:

	Births	Rate	Deaths	Rate
1927	50,940	18.96	24,721	9.2
1928	49,441	18.16	25,969	9.54

*Subject to slight revision.

COMMUNICATIONS

STATE OF MINNESOTA INSURANCE DIVISION
DEPARTMENT OF COMMERCE,
SAINT PAUL

March 30, 1929.

Dr. E. A. Meyerding,
Secretary, State Medical Society,
11 West Summit Avenue,
Saint Paul, Minnesota.

Dear Sir:

Numerous complaints have been received by this Department from citizens of this State who have accepted policies of insurance issued by companies not licensed by this Department. These companies have no licensed agents in the State and operate entirely by the use of the mails, and hence it is impossible for this Department to obtain jurisdiction over such companies.

Among these unlicensed insurers are many which confine their activities to members of your profession, some of them issuing, chiefly, malpractice policies. It is seldom that any information reaches the Department concerning the solicitation of insurance by these companies until a claim arises and then it is too late for the Department to be of any assistance to the insured.

We suggest, when the opportunity arises, that you direct the attention of your members to the practices of these companies and advise your members, when solicited for insurance, that they ascertain whether the company is one duly licensed to write business in this State and advise them that if they place insurance with an unauthorized company this Department can render no assistance to them and, further, that the courts of this State have no jurisdiction to hear or determine their claims because it is impossible to serve upon such insurers, entailing the necessity of the claimant going into the state where the company is licensed, to bring his action.

As previously stated, this letter is occasioned by the numerous complaints which we have received recently, many of them coming from members of your profession, from which it is apparent that these insurers are particularly active in your membership.

Yours very truly,
(signed) C. P. Diepenbrock,
Deputy Insurance Commissioner.

Minneapolis, Minn., April 2, 1929.

To the Editor:

In the April, 1929, issue of the State Journal, page 238, under the heading "Proceedings of the Minnesota Academy of Medicine," Dr. Franklin R. Wright is quoted in part as follows: "In another case, at the suggestion of my friend Dr. Farr, I used novocaine as an anesthetic. One grain was given. The patient died of novocaine poisoning. I always used tropicain, except in this one case."

The statements contained in the above quotation exemplify some characteristics which are not uncommon in the literature or spoken word when local anesthesia is the topic of discussion. While the statement that this patient died after being given novocaine, at my suggestion, might be interpreted as a personal criticism, I am certain Dr. Wright had no such intention—especially as I was not present when the remarks were made.

My reasons for referring to Dr. Wright's discussion are that other erroneous conclusions, besides the one mentioned above, might be drawn from his statements, which are somewhat short on qualifications.

I assume that when Dr. Wright refers to "tropicain," he means the drug known as "tropococain." This drug is conceded by all authorities upon the subject to be at least twice as toxic as novocaine, the potency being equal. This, of course, is the reason for the choice of novocaine, by the vast majority of surgeons, for the production of analgesia—whether of the intra-spinal or other types.

The toxicity of novocaine is so dependent upon the manner of its administration and the total amount of the drug used is so relatively unimportant that the statement that a patient died after the administration of a certain amount—unless carefully qualified by a recitation of other factors—has practically no significance. In spinal anesthesia especially, unless precautions are taken to prevent the drug reaching the higher nerve centers—in the brain—death may result from exceedingly small doses. The specific gravity of the injected solution, the position of the patient immediately after its injection, etc., are of the utmost importance.

I wish also to correct another impression which Dr. Wright's statements may have made, to wit: my own experience with spinal anesthesia has been so comparatively limited that I have never, so far as I can recall, presumed to instruct anyone in the manner of its administration, which is, after all, the crux of the subject of the toxicity of spinal anesthesia. I believe, however, that the toxicity of local anesthetics, when their potency is taken into account, is quite nearly parallel whether they are employed intra-spinally or otherwise—if this be true, novocaine would still be more desirable than tropococaine, even for spinal anesthesia—a premise which is borne out by the majority of observers.

Thanking you, I am,
Yours truly,
Robert Emmett Farr, M.D.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION
SIXTY-FIRST ANNUAL SESSION

PROGRAM

MONDAY, MAY 13, 1929

10:00 A. M.

Meeting of the Council

BLUE ROOM

MASONIC TEMPLE

2:00 P. M.

Meeting of the House of Delegates

BLUE ROOM

MASONIC TEMPLE

Registration and Meeting Headquarters

MASONIC TEMPLE

OFFICERS

J. T. CHRISTISON, *President*.....Saint Paul
A. G. LIEDLOFF, *First Vice President*.....Mankato
C. O. ESTREM, *Second Vice President*.....Fergus Falls
E. A. MEYERDING, *Secretary*.....Saint Paul
A. G. SCHULZE, *Treasurer*.....Saint Paul

JOINT CHAIRMAN, PROGRAM AND GENERAL ARRANGEMENTS COMMITTEE

J. S. WHITE.....Saint Paul

SECTION ON MEDICINE

C. N. MCCLOUD.....Saint Paul
R. L. NELSON.....Duluth

SECTION ON SURGERY

WALTMAN WALTERS.....Rochester
S. H. BAXTER.....Minneapolis

CLINICAL DEMONSTRATIONS

W. A. O'BRIEN.....Minneapolis

SCIENTIFIC EXHIBITS

W. A. O'BRIEN, *Director*

MAYO CLINIC

Diseases of the Heart
F. A. WILLIUS, A. R. BARNES, and H. L. SMITH
Diphyllobothrium Latum
T. B. MAGATH and H. E. ESSEX
Carcinoma of Lung
P. P. VINSON, H. F. MOERSCH, and B. R. KIRKLIN
Congenital Anomalies of the Valves of the Right Auricle
WALLACE YATER
A Case of Heart Block
R. A. WILLIUS and WALLACE YATER
Special *X*-ray Exhibit
C. SUTHERLAND
Cellodin Casts of Heart Cavities and Circulation Paths
M. B. WHITEN

UNIVERSITY OF MINNESOTA

Fresh Gross Pathology Demonstration
University of Minnesota Medical School, Department of Pathology.

MINNESOTA DEPARTMENT OF HEALTH

Communicable Diseases
O. MCDANIEL
Milk
MR. H. A. WHITTAKER
Venereal Disease
H. G. IRVINE
Maternal and Infant Hygiene
E. C. HARTLEY

MINNESOTA RADIOLOGICAL SOCIETY

Plate Demonstration

GYNECOLOGICAL

Lipiodol Filling of the Uterus and Tubes
W. A. COVENTRY and RUSSELL J. MOE, Duluth

CLINICAL PROGRAM

RAMSEY COUNTY MEDICAL SOCIETY

Monday Morning, May 13

8:30 A. M.

AUDITORIUM, MASONIC TEMPLE

W. H. HENGSTLER, *Presiding Officer*

Coronary Occlusion
E. T. F. RICHARDS.....Saint Paul
Emergency Surgery of the Upper Abdomen
HARRY ZIMMERMANN.....Saint Paul
Cretinism and Other Glandular Insufficiencies
WALTER RAMSEY.....Saint Paul
Pneumonia and its Complications
E. V. GOLTZ.....Saint Paul
Emergency Chest Surgery
H. J. O'BRIEN.....Saint Paul
Plastic Surgery
HARRY RITCHIE.....Saint Paul
Medical Conditions of the Large Bowel and Appendix
CHARLES N. HENSEL.....Saint Paul
Surgical Conditions of the Large Bowel and Appendix
ROBERT EARL.....Saint Paul
Complimentary Luncheon by Ramsey County Medical Society, Ground Floor, Masonic Temple.

Monday Afternoon, May 13

1:30 P. M.

AUDITORIUM, MASONIC TEMPLE

PRESIDING OFFICERS

C. NAUMANN MCCLOUD and WALTMAN WALTERS, *Chairman;* STEPHEN H. BAXTER and ROBERT LYMAN NELSON, *Secretaries*

Physicians and Dentists Service Bureau
D. D. HILGER.....Saint Paul

SYMPOSIUM ON FRACTURES

Fractures of the Bones of the Hands and Fingers
B. S. ADAMS.....Hibbing
Fractures of the Wrist
M. H. TIBBETTS.....Duluth
Fractures About the Elbow Joint
WALLACE COLE.....Saint Paul
Acromio Clavicular Dislocations *(lantern slides)*
MYRON HENRY.....Minneapolis
Fractures and Injuries of the Spine
J. R. KUTH.....Duluth
Tibial Fractures into the Knee Joint
ARTHUR COLLINS.....Duluth
Delayed Union and Its Causes
M. S. HENDERSON.....Rochester

Fractures of the Os Calcis and the Small Bones of the Foot
C. C. Chatterton.....Saint Paul
Local Anesthesia in Fractures
Carl O. Rice.....Minneapolis
Fractures about the Hip Joint
J. S. Holbrook.....Mankato
Unhappy Results in the Treatment of Fractures *(lantern slides)*
Kellogg Speed.....Chicago
Associate Professor of Surgery, Rush Medical College
Round Table Discussion on Fractures
Led by Kellogg Speed
Compound Comminuted Fractures of the Forearm
M. O. Oppegaard.....Crookston
Fractures of the Elbow
W. G. Workman.....Tracy
Case Report
L. Sogge.....Windom
Recurrent Fractures of the Patella
W. A. Piper.....Mountain Lake

1. Attending physicians are invited to bring abstracts of cases with x-ray films dealing with fractures and injuries for discussion. The requests for the presentation of such cases should be mailed to the Secretary, State Society, three days before the meeting.
2. There will be a demonstration of orthopedic appliances and application of casts.

Monday Evening, May 13
6:00 p. m.
Phi Rho Sigma Annual Alumni Banquet
LOWRY HOTEL
8:00 p. m.
AUDITORIUM, MASONIC TEMPLE

MEDICAL ECONOMICS MEETING

E. A. Meyerding, *Chairman*

The Medical Reserve
Col. George A. Skinner, M. C. U. S. A.....Omaha
Surgeon, Seventh Corps Area

SYMPOSIUM ON COST OF MEDICAL CARE

Rural Aspects
O. E. Locken.....Crookston
President, Minnesota League of Municipalities.
Social and Economic Research
Michael M. Davis, Ph.D.....Chicago
Julius Rosenwald Fund
The Doctor's Problem
Morris Fishbein.....Chicago
Legislation and Economics
Herman M. Johnson.....Dawson
"Better Halves"—A Sketch
Members of the Auxiliary

Tuesday Morning, May 14
8:30 a. m.
AUDITORIUM, MASONIC TEMPLE

DIABETES

The Treatment of Diabetes *(lantern slides)*
Elliot Proctor Joslin.....Boston
Professor of Medicine, Harvard University.
Glycosuria in Life Insurance Examinations
Henry Wireman Cook.....Minneapolis
Diabetes in its Relation to Surgery
George P. Muller.....Philadelphia
Discussion
Henry L. Ulrich.....Minneapolis
Summary
Elliot Proctor Joslin.....Boston
Sense of Hearing Survey of the School Children in Fergus Falls
W. L. Burnap.....Fergus Falls
Scientific Exhibit *(Pathological Demonstration, Department of Pathology, University of Minnesota)*
Early Diagnosis of Heart Disease
*Chas. Lyman Greene.....Saint Paul
Joseph F. Borg.....Saint Paul
Cardiac Decompensation and its Treatment *(lantern slides)*
Moses Barron.....Minneapolis

DISCUSSION:

S. Marx White.....Minneapolis
F. A. Willius.....Rochester

Tuesday Afternoon, May 14
12:30 p. m.

Cinematography Demonstration of Living Tissue Cells Growing in Vitro *(Canti)*
A. C. Strachauer.....Minneapolis
Spinal Anesthesia *(lantern slides)*
Daniel H. Bessesen and Edgar A. Rygh..Minneapolis
Hernia of the Diaphragm Through the Esophageal Hiatus *(lantern slides)*
Walter H. Ude.....Minneapolis
Perversion of Diaphragmatic Function *(lantern slides)*
George P. Muller.....Philadelphia
Professor of Clinical Surgery, University of Pennsylvania
Intermission
Scientific Exhibit *(Mayo Clinic Demonstration)*

GOITER SYMPOSIUM

Familial Tendency in Goiter *(lantern slides)*
A. E. Booth.....Minneapolis
Thyroid as a Cause of Cardiac Disability
Donald K. Bacon.....Saint Paul
Preliminary Hemostasis in Thyroidectomy *(moving picture demonstration)*
Martin Nordland.....Minneapolis
The Exophthalmos of Graves' Disease *(lantern slides)*
Frank E. Burch.....Saint Paul
Surgical Treatment of Diseases of the Thyroid Gland *(lantern slides)*
J. deJ. Pemberton.....Rochester
Treatment of Toxic Thyroid with Rays of Short Wave Length
T. G. Clement.....Duluth

DISCUSSION:

Elliot Proctor Joslin.....Boston
Charles H. Mayo.....Rochester

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*Deceased.

THE ANNUAL BANQUET

PALM ROOM—SAINT PAUL HOTEL

Tuesday Evening, May 14

6:30 P. M.

Toastmaster, R. C. FARRISH, Sherburn

Introduction of Guests

Address of Welcome

WALLACE H. COLE.....Saint Paul
President, Ramsey County Medical Society

The Women's Auxiliary

MRS. BEN F. DAVIS, President.....Duluth
President-Elect

State Association

C. B. WRIGHT, Past President.....Minneapolis

J. T. CHRISTISON, President.....Saint Paul
President-Elect

Entertainment

Wednesday Morning, May 15

8:30 A. M.

Incidence of Liver Disease in Infancy and Childhood

F. W. SCHLUTZ.....Minneapolis

The Treatment of Amenorrhea Associated with Endocrine Disorders *(lantern slides)*

WILLIAM ENGELBACH.....Saint Louis

The Value of Thoracic and Lumbar Ganglionectomy in the Treatment of Raynaud's Disease, Scleroderma, and Thrombo-Angiitis Obliterans *(moving picture demonstration)*

A. W. ADSON and G. W. BROWN.....Rochester

Undulant Fever *(lantern slides)*

F. J. HIRSCHBOECK.....Duluth

Discussion and Case Report

A. B. STEWART.....Owatonna

Relation of Physical Findings to Lung Pathology

S. H. BOYER.....Duluth

Installation of Officers

Factors to be Considered in Gall Bladder Surgery

OLAF J. HAGEN.....Moorhead

UROLOGY

The Recognition and Treatment of Urinary Lithiasis

ARTHUR L. CHUTE.....Boston
Associate Professor, Genito-Urinary Diseases, Tufts College

Lesions Associated with Urinary Lithiasis

F. E. B. FOLEY.....Saint Paul

Surgical Technic

GILBERT J. THOMAS.....Minneapolis

Factors Favoring Recurrence of Renal Stone *(lantern slides)*

WM. F. BRAASCH.....Rochester

Summary

ARTHUR L. CHUTE.....Boston

Wednesday Afternoon, May 15

1:00 P. M.

Our History

A. S. HAMILTON.....Minneapolis

Head Injuries and Their Treatment *(lantern slides)*

CLARENCE W. HOPKINS.....Chicago
Chief Surgeon, Chicago & Northwestern Railway

DISCUSSION:

W. H. HENGSTLER.....Saint Paul

A. W. IDE.....Saint Paul

AUDITORIUM

The Common Cold *(lantern demonstration and moving pictures)*

HILDING C. ANDERSON.....Duluth

Injection Treatment of Varicose Veins *(lantern slides)*

H. O. MCPHEETERS.....Minneapolis

DISCUSSION:

J. M. HAYES.....Minneapolis

Minnesota Radiological Society *(Plate Reading Clinic)*

Cinematography—Davis' Obstetrical Film

LIBRARY

Dangers and Difficulties in the Use of the Esophagoscope *(lantern slides)*

D. GRETH GARDINER.....Saint Paul

A Consideration of Certain Intestinal Parasites

PHILIP W. BROWN.....Rochester

Common Skin Diseases *(lantern slides)*

E. Z. SHAPIRO.....Duluth

Practical Notes on Syphilis

ARTHUR KAHALA.....Crookston

The Care of Psychiatric Patients in Private Practice

E. J. ENGBERG.....Saint Paul

Obstetrical Experience of the Rural Physician

A. J. HENDERSON.....Kiester

Discussion

J. S. LITZENBERG.....Minneapolis

M. C. BERGHEIM.....Hawley

Treatment of Carcinoma of the Esophagus

HERMAN MOERSCH.....Rochester

Treatment of Acute Otitis Media in Infants and Children

C. W. RUMPF.....Faribault

WOMEN'S AUXILIARY OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Monday Afternoon, May 13

Meeting of the State Executive Board

Saint Paul Institute

Monday Evening

Medical Economics Meeting

Masonic Temple

All attending physicians and their wives are invited

Tuesday, May 14

ANNUAL MEETING

SAINT PAUL ATHLETIC CLUB

Address

President J. T. CHRISTISON

Quacks in Minnesota

MR. F. MANLEY BRIST

Business Meeting

12:30 P. M.

OPEN FORUM LUNCHEON

Talks by E. P. JOSLIN, G. A. SKINNER and C. H. MAYO, Saint Paul Athletic Club

2:30 P. M.

Tea, Saint Paul Institute.

6:30 P. M.

ANNUAL BANQUET

Palm Room, Saint Paul Hotel. All attending physicians and their wives are invited

AUXILIARY COMMITTEES

President of the Women's Auxiliary of the Ramsey County Medical Society—MRS. A. G. SCHULZE.

Hospitality Committee—MRS. E. R. BRAY, MRS. L. W. BARRY, MRS. W. D. BEADIE, MRS. L. E. DAUGHERTY, MRS. GEORGE EARL, MRS. A. W. IDE and MRS. VICTOR PETERSON.

Registration—MRS. CARL LARSON.

CHICAGO MEDICAL SOCIETY SUMMER CLINICS

The Chicago Medical Society will hold a two weeks clinics at Cook County Hospital, June 17 to 29, inclusive. Members of the hospital staff will give these clinics on the following schedule:

8 to 10 a.m.	Medical and surgical clinics in amphitheatres.
10 to 12 a.m.	Ward walks.
12 to 1 p.m.	Luncheon.
1 to 3 p.m.	Medical and surgical clinics in amphitheatres.
3 to 5 p.m.	Ward walks.

The amphitheatre work will be devoted to medical and surgical dry clinics and lectures. Two amphitheatres will be used simultaneously, one for medical and one for surgical clinics. Each clinic will be one hour in length, thus giving four medical and four surgical clinics daily. Operative work will be done during the hours devoted to ward walks. The clinical work will be confined largely to general medicine and surgical subjects.

It is planned to hold six meetings to be addressed by speakers other than members of the hospital staff on such subjects as heart disease, tuberculosis, obstetrics, physiotherapy, gastro-intestinal disorders and possibly diabetes.

A registration fee of ten dollars will be charged to cover the cost of preparing for and conducting the clinics.

For further information apply to the Chicago Medical Society, 185 N. Wabash Ave., Summer Clinics Committee.

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

The West Central Minnesota Medical Society met at Morris, Minn., April 10, 1929. Following a dinner served at the Merchants Hotel, Dr. S. J. Thorson read a paper on Acute Empyema. Dr. A. F. Giesen presented a paper on Neurasthenia. Both papers were discussed by members of the society.

On July 15, 1929, the society will have their annual picnic at Glenwood, Minn. Drs. Eberlin, Giesen and Linde were elected members of the arrangements committee.

HERMAN LINDE, M.D.
Secretary.

OF GENERAL INTEREST

Work has been started on a new hospital at Moose Lake, Minn., to be known as the Community hospital.

Dr. F. G. H. Maloney of Rochester, Minn., is now located at Ironwood, Michigan, with offices in the Pharmacy Building.

Dr. Henry N. Klein of Saint Paul sailed early in April for Europe, where he will spend some time in study at Vienna.

Dr. William H. Rumpf, Jr., has disposed of his practice in Minneapolis and is now associated with the St. Cloud Clinic, St. Cloud, Minn.

The Phi Beta Pi national medical fraternity will hold a luncheon at noon Tuesday, May 14, in Saint Paul during the state medical meeting.

Phi Rho Sigma will hold its annual banquet at the Lowry Hotel, Saint Paul, at 6 P. M. Monday, May 13, at the time of the state medical meeting.

Minneapolis was selected as the meeting place for the 1930 convention of the American College of Physicians, the time being set for some time in February.

Dr. and Mrs. Henry E. Michelson of Minneapolis sailed in April from New York for a two months' trip abroad. They plan to visit in London, Paris and Vienna.

Dr. Henry E. Combacker of Osceola, Wisconsin, father of Dr. L. C. Combacker of Fergus Falls, Minnesota, died April 2, following a brief illness of pneumonia.

Dr. J. A. Bloomer, formerly of Rochester, has gone to Maryville, Missouri, to be associated in practice with Dr. J. H. Ryan, a former Fellow in the Mayo Foundation.

Dr. Clifford E. Henry, Minneapolis, as national delegate of the Military Order of Foreign Wars, attended the triennial convention of the order in New York City, April 12 and 13.

The marriage of Miss Agnes L. Kealy of Duluth and Dr. H. W. Huseby of Cloquet was solemnized in Duluth, Monday, April 1. Dr. and Mrs. Huseby are now at home in Cloquet.

Dr. and Mrs. George Geist of Saint Paul sailed in April from New York for Naples, Italy. They will spend some time in Budapest, Vienna, and Switzerland before returning home.

Announcement has been made of the engagement of Miss Ruth Ann Cantillon, daughter of M. E. Cantillon of Los Angeles and Minneapolis, to Dr. Douglas Parry Head, son of Dr. and Mrs. George D. Head, Minneapolis.

At the annual meeting held April 11, 1929, the following were elected officers of the staff of Fairview hospital, Minneapolis: President, Dr. Looe Baker; vice-president, Dr. O. F. Schussler; secretary-treasurer, Dr. A. W. Dahlstrom.

Plans have been completed for the erection of a $27,000 building at Faribault, Minn., to be known as the Central Clinic. The building will be occupied by Drs. Haessly, Hanson and Traeger. Construction will start immediately, it has been announced.

Dr. W. G. Paradis of the Glen Lake sanatorium staff at Oak Terrace, Minn., has been appointed superintendent and medical director of Sunnyrest sanatorium at Crookston and will assume his new duties May 3. Dr. Paradis succeeds Dr. James K. Anderson, who resigned to take up private practice in Minneapolis.

Announcement has been made of a gift of $10,000 to the Children's Hospital of Saint Paul by Mrs. Samuel D. Flagg as a permanent memorial to the late Dr. Samuel D. Flagg, one of the first practitioners in Saint Paul, who died about a year ago. The money will be added to the permanent endowment fund of the hospital.

Dr. Ernest S. Mariette, superintendent of Glen Lake sanatorium, Oak Terrace, has returned from Florida, where he has spent the past six months. Dr. Mariette became ill last summer and was granted a year's leave of absence from his duties as head of the sanatorium. His health is much improved and he plans to resume his regular duties July 1.

Dr. Russell M. Wilder of the Mayo Clinic, Rochester, has been appointed professor and chairman of the department of medicine at the University of Chicago. He will succeed, June 1, to the chairmanship vacated by Dr. Franklin C. McLean, who has been made director of university clinics. Dr. Wilder will direct a study of diseases of the pituitary gland, which has been made possible through a gift of $75,000 to the university by John D. Hertz.

Among the Minnesota physicians who attended the meeting of the American College of Physicians held in Boston, April 8 to 12, were the following: Cyril M. Smith, Duluth; J. Fowler Avery, Clifford E. Henry, A. L. Herman, R. J. McAdory, Robert I. Rizer, Samuel A. Weisman, S. Marx White and Arthur A. Wohlrabe, Minneapolis; Samuel Franklin Adams, Edgar V. Allen, Clifford J. Barborka, J. Arnold Bargen, George E. Brown, Frederick Gaarde, Arthur H. Sanford and Albert M. Snell, Rochester; Everett K. Geer, John A. Lepak and Benjamin B. Souster, Saint Paul.

Dr. A. C. Strachauer has returned from a month's vacation in Florida to resume his private practice at the Nicollet clinic, together with part-time service as director and surgeon-in-chief of the cancer institute at the University of Minnesota.

Dr. Strachauer resigned as head of the department of surgery at the university school of medicine recently to enable him to devote part of his time to his private practice, retaining only his work in the cancer institute.

He will be succeeded as head of the department of surgery by Dr. Owen H. Wangensteen, Dean E. P. Lyon has announced. Dr. Wangensteen will study at Rochester and in Europe the balance of this year and will take over the surgery department January 30, 1930.

Dr. Strachauer has been notified of his election to the board of governors of the American Society for the Control of Cancer. This is a national organization, with headquarters in New York City, and recently reorganized as a foundation with an endowment of one million dollars for research into the problem of malignancy.

OBITUARY

Charles Lyman Greene

Born, Gary, Maine, 1862—Died, St. Paul, Minn, Jan. 18, 1929

Doctor Greene has gone and with his passing goes another one of those stalwart physicians who pioneered in medicine in Minnesota; 1890 to 1929—thirty-eight years of arduous practice. After graduating from the Academic College of the University of Michigan, he came to St. Paul, married Jessie Rice and settled down to work as a clerk in the general offices of the Northern Pacific railroad. With one child added to his family, the blood of his medical father called to him and, undaunted by his responsibilities, he began his medical studies at the University of Minnesota. In his junior year his eyesight temporarily failed, but undeterred and with the help of his wife, who read to him, he continued his studies without interruption and graduated from the University of Minnesota in 1890.

He immediately started his eventful medical career as assistant to that lovable, capable, and wise physician, Perry Millard, for whom Millard Hall, on the University of Minnesota Campus, is named.

As first City Physician under the late Dr. Arthur B. Ancker and attendant at the City Hospital, he began at once to record his medical experiences and observations in various publications.

Not satisfied with his equipment, he later worked with that greatest of all teachers, Sir William Osler, in Baltimore, and when he finished his first book, "Medical Diagnosis," a compendium of accurate knowledge and wise information so helpful to the students whom he taught, he dedicated its pages to that early source of his inspiration.

He further broadened his knowledge and widened his horizon by travel and study abroad in London, Paris, Berlin and Vienna and in the early part of 1894 was given the chair of "The Practice of Medicine," at the University of Minnesota, where he continued to be a source of knowledge and inspiration to many students throughout the state, as his large practice and his frequent consultations amply testify. Later he was made Chief of the Department of Medicine at the University of Minnesota, in which capacity he demonstrated his ability to organize and administer smoothly and efficiently the many problems and conflicts which inevitably arise in any medical school.

In 1914, he began that now historic fight to prevent a liaison between the Medical School and a private institution. Only those who were closely associated with him at that time can realize what that step meant to him—the end of his university teaching—which had meant so much to him for so many years and for which he was so eminently fitted. Nevertheless, be-

lieving that such a union was fundamentally bad for the Medical School which he had served for so many years, he resigned his position, and waged a clean, masterful, losing fight, in which he was supported by a majority of the profession of the state.

He did not confine his teaching to the University class room, but extended it to the wards of the hospitals and even in his private consulting room. Those who were privileged to work as his assistants benefited by his wide knowledge, keen diagnostic acumen and masterful handling of his patients.

Early interested in heart disease, he did much by his writings and teachings to establish a better understanding of cardiac problems, developed a workable plan for rehabilitating these patients, and pioneered in bringing to these patients and their attending physicians also the belief that heart disease was not inevitably fatal, but was responsive to treatment in a majority of instances, and often compatible with many years of usefulness.

As Chief Medical Examiner for the Minnesota Mutual Life Insurance Company, he found a confusion of standards among the various companies as to good and bad risks and methods of examination. He promptly produced a book on "Medical Examination for Life Insurance," which I am told still stands as one of the most satisfactory and complete works on that subject.

Many physicians have profited by his tutelage. Doctor Albert Heath was, I believe, his first assistant, to be followed by the late Doctor Judd Goodrich and he in turn by the late Doctor Peder Hoff, who remained with him for six years and helped in the preparation of his "Medical Diagnosis." His place was taken by Doctor Bristol, now Commissioner of Health of the state of Maine. Then came Drs. E. T. F. Richards and F. A. Olson, the latter now a successful surgeon in Minneapolis. They were followed by the writer of this tribute, who served him from 1914 to 1920, and who still today gladly acknowledges the lift and inspiration he obtained from that association. The late Doctor Ralph Morris served for a time; also Doctor Carl B. Drake and Doctor R. B. Morrissey. After them Doctor Harold E. Richardson, who materially helped in preparing the chapters on Electocardiography in later revisions of his "Medical Diagnosis." And finally, Drs. Warnock and Borg, who stood by him at the last when the wear and tear of his many years of strenuous practice, University teaching and constant study and writing, and repeated revisions of his "Medical Diagnosis," had broken his body though not his spirit.

With that characteristic fortitude and courage which he had exhibited all his life, he battled for two years physical handicap and disability and finally succumbed to that dreadful malady, angina pectoris, which for many of the last months of his life was an agonizing torment.

So passes a good physician, a wise counsellor, a sound teacher, and a loyal friend.

All hail!

C. N. Hensel, M.D.

Nelson H. Marshall
1861-1929

Dr. Nelson H. Marshall, a practising physician in Chaska, Minnesota, for 34 years, died suddenly Friday, April 5, of heart failure, at the age of 67 years.

Nelson H. Marshall was born July 24, 1861, at Brownsville, Pa. He was one of seven children of a Methodist minister and his wife. He received his academic training in St. Louis, Mo. His medical training was received at the University of Minnesota. Soon after completing his medical studies in 1892 he was united in marriage with Rachel Taggart, December 20, 1894, at St. Paul, Minn. Shorty after their marriage Dr. and Mrs. Marshall came to Chaska, where he practised until his death, and where in the entire community he was known not only for his fine personal qualities, but also for upholding the fine traditions of the profession to which he belonged. For about 30 years he held the position of public health officer. He was deeply interested in the general welfare of the community.

He is survived by an only daughter, Miss Dorothy Marshall, of Chaska, and three sisters: Mrs. W. A. Magraw and Mrs. J. W. Fogg, of Chicago, and Mrs. J. W. Little of Minneapolis.

John Wyatt
1876-1929

Dr. John Wyatt, 53 years old, a resident of Minneapolis for 45 years, died Tuesday, Feb. 12, 1929. He was born in St. Lawrence county, New York, and was a graduate of Northwestern university medical college. Surviving him are his wife, two daughters, Mrs. L. D. Ordway and Mrs. H. A. Moe of Minneapolis, and two brothers, Simon D. Wyatt of Fond du Lac, Wis., and James C. Wyatt of Chicago.

Otis J. Brown
1856-1929

Dr. O. J. Brown, Morrison county coroner and Little Falls health officer, died March 28, 1929, following a paralytic stroke. He was 73 years old. He practised in Red Wing from 1889 to 1904.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 13, 1929.

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 13, 1929. Dinner was served at 7 o'clock.

The meeting was called to order at 8 o'clock by the President, Dr. C. N. McCloud. There were 35 members present.

Minutes of the February meeting were read and approved.

Dr. E. T. F. Richards read the following memorial to Dr. Charles Lyman Greene, and a motion was carried that this be spread on the permanent records of the Academy and a copy sent to the family.

Charles Lyman Greene was born in Gray, Maine, in 1862. He died in St. Paul on January 19, 1929, at the age of 66 years, from cerebral hemorrhage. His father was a well known surgeon of Massachusetts and Maine and was at one time Professor of Surgery in the University of Michigan.

Receiving his early education in the public schools of Portland, Maine, Dr. Greene was graduated from the University of Michigan in 1885. He then studied medicine at the Universities of Michigan and Minnesota, receiving his M.D. from the University of Minnesota in 1890. This was followed by a year of post-graduate work at Harvard and Johns Hopkins, and in Europe.

Dr. Greene held many important positions on the Medical Faculty of the University of Minnesota: Instructor in Applied Anatomy 1894-1897; Professor of Clinical Medicine and Physical Diagnosis 1897-1903; Professor of the Theory and Practice of Medicine 1903-1909; Professor of Medicine and Chief of the Department 1909-1915. He was also attending physician to several St. Paul hospitals: The City, St. Luke's, the Miller, and the State Hospital for Crippled Children.

Dr. Greene was a member of several medical societies, including the Association of American Physicians, the American Association for the Advancement of Science, American Medical Association, American Therapeutic Association, American College of Physicians, Minnesota State Medical Society, Minnesota Society of Internal Medicine, and the Minnesota Academy of Medicine. He served on different occasions as President of the Minnesota State Medical Society and the Minnesota Society of Internal Medicine. He was at one time medical director of the Minnesota Mutual Life Insurance Company, and President of the National Association of Life Insurance Examiners.

Dr. Greene was a prolific writer and was the author of several well known works, including "Medical Examination for Life Insurance," "Medical Diagnosis," as well as numerous articles on disease of the heart in medical periodicals.

He was a member of the Authors', the Royal Societies' and the American Universities' Clubs in London, England; the National Arts, and the Delta Kappa Epsilon Clubs of New York City; the Lafayette Club of Minneapolis, and the Minnesota and University Clubs of St. Paul.

His war record, though hampered by physical disability, was a brilliant one. Appointed Contract Surgeon in September, 1917, he secured a commission as Captain in November, 1917, received his Majority in October, 1918, was commissioned Lt. Colonel in April, 1919, and was made Colonel of the Medical Section, Officers Reserve Corps, in July, 1919.

Possessed of a poise and composure which outwardly nothing disturbed, Dr. Greene was able at all times to bring to the bedside of the sufferer a helpful, reassuring scense of security. His ability to attract and enthuse students and the younger members of the profession made his career as a teacher a notably happy and successful one. His unfailing hospitality, courtesy and charm endeared him to his associates who by his passing have suffered the loss of a loyal friend.

(Signed) John E. Hynes,
G. E. Senkler,
E. T. F. Richards.

The scientific program of the evening consisted of a paper and case reports as follows:

Dr. Arnold Schwyzer (St. Paul) read a paper on "Chronic Mastitis."

DISCUSSION

Dr. J. F. Corbett (Minneapolis): I was greatly interested in Dr. Schwyzer's paper and, as he read it, it occurred to me what I thought was a good definition of malignancy; that malignancy was a riotous atypical proliferation of the epithelial cells; and as I looked at some of these pictures—some of them suggesting carcinoma that were not carcinoma, and others that looked very much like them that were malignant—it occurred to me how easy it is to make a mistake in the histological section.

Bearing in mind the atypical character of the cell, that it is riotous, that it breaks into the surrounding tissue through its membrane, we have something on which to base a diagnosis of malignancy.

In papillomatous growths that were described by Greenough and Hartley, three of these were encountered in a series of twenty malignancies.

On the other hand, I have encountered several cases with such epithelial proliferations, have removed them locally, and followed the cases for years and no malignancy has resulted.

In these, as one studied the cells carefully under the microscope, our first impression of an atypical cell disappears, and we find we are dealing with an orderly arrangement of cells and an orderly cell.

Dr. A. R. Colvin (St. Paul): Dr. Schwyzer has presented a subject which should invite a very great deal of discussion. Somebody has said that tumors of the breast have formed the pathological and histological high school of pathology.

What is adenocystic disease and what are we going to call all the various phases of it? Dr. Schwyzer has indicated the various names applied to it and yet we do

not know what it is; the various names given it are an indication as to the different views held as to its nature; that is, is it primarily neoplastic or primarily inflammatory. The clinical pathological picture is not the picture we see in tumors anywhere else.

Dr. Schwyzer has reminded us of the changes that breast tissue undergoes at different times. It is interesting that the periods at which pathological changes are liable to occur are those in which physiological changes occur; at birth we frequently find inflammatory trouble, even abscess at puberty, and again in lactation; all of these physiological states are accompanied by hyperemia and, as I have said, by acute or subacute inflammation. The changes occurring are spoken of as assimilatory and dissimilatory. Changes of a somewhat similar nature occur in the male breast. Clinically these breasts are uniformly enlarged and firm; histologically they present something of the pictures seen in adenocystic disease, in dilatation of ducts and increase in acini, and the presence of a surrounding loose fibrocellular tissue. This condition in the male breast may disappear spontaneously as in one case, the subject being a physician about 35 years of age, one breast and then the other became enlarged and tender and puffy-looking. This condition persisted for some time and then disappeared. The doctor told me that during his wife's previous pregnancies he was always nauseated, but this time the breasts assumed the condition just described. These breasts represent plainly a combination of hypertrophy and inflammation; in other words, about the same picture seen after birth and at puberty and during lactation.

Dr. Schwyzer has shown us the various phases of structural changes found associated with adenocystic disease, most of them not malignant, but in some there was associated malignancy. The great point is, and the point upon which turns the importance of the surgeon's judgment, whether or not such a breast has anything to do with malignancy or whether malignancy is simply an associated condition. Ten to fifty per cent of such breasts are, according to different observers, malignant.

The recognition clinically of adenocystic disease, or cystic mastitis, is usually easy and when one feels in the breast a lot of little shot-like bodies one can arrive at the conclusion that the patient has cystic mastitis.

When a definite lump is felt in a breast in which one has diagnosed cystic mastitis, there may be doubt as to whether or not the lump means carcinoma developing in such a breast. Such breasts should, I think, be explored. At exploration the question of histological examination arises; if it is positive of carcinoma, well and good, but if it is negative from one area it is still uncertain as to whether carcinoma has not begun in another area, because adenocystic disease is a generalized disease of the breast and, indeed, perhaps always both breasts. Such an explored breast should, I think, be removed whether carcinoma is present or not. It can thus be inferred that great judgment is required in the therapeutic approach to such breasts. In young people, I think we are justified in leaving them alone; even a bloody discharge from the nipple in young people need not cause alarm. I can recall one such case in a young girl, ten years ago, who had been advised to have her breast removed and did not have it done. She is now married, has a child, and has had no trouble.

It is interesting to recall a personal conversation with Dr. Bloodgood, years ago, in which he said that no matter whether excision of an area, removal of the entire breast, or radical operation had been done, in no case had they seen later carcinoma develop; and breast pathology has been a very intensive study at the Hopkins.

It is also interesting to note that the older writers on breast pathology did not stress the occurrence of malignancy in cystic mastitis, and that the greater tendency to cyst formation evidently the less tendency to malignant degeneration.

Dr. Schwyzer (in closing): Dr. Corbett has spoken of the arrangement of the epithelium. The regular arrangement as seen under low power is most important. Unless we have the good fortune of having a competent pathologist at our side—and even then—we ought to understand the pathology of this condition ourselves and study these cases carefully under the microscope. In private practice we do not get an enormous material, but we have a good chance to study the cases individually and follow them up.

I noticed that several men smiled when Dr. Colvin mentioned the swelling of some husband's breasts when his wife was pregnant. The explanation must be looked for in a very reactive sympathetic nervous system. In support of that case I might tell you of a most extreme case I read of in the Swiss Medical Wochenschrift some time ago. The case was reported by a Swiss doctor who had practised in Syria or Palestine. He stated the following personal observation: There was a young couple, both natives of that country, who were very happy. The young wife contracted tuberculosis. Soon after the birth of a child the wife died of her tuberculosis. The man was so wrapped up in that child, and was so frantically afraid that it might not live, that his breasts became lactating and he was able to nurse the child for a considerable length of time. (Relata refero.)

Dr. Wallace Cole (St. Paul) reported two cases of foreign bodies in the joints. Lantern slides were shown.

Dr. J. F. Hammond (St. Paul) reported a case of ruptured tubal pregnancy, as follows:

The chief interest in this case is the fact that microscopically there was no evidence of pregnancy. The woman was 37 years old and in 1926 she was operated upon for ruptured tubal pregnancy. The tube was removed and she has been quite well since. In December, 1928, she had her last menstrual period and then did not flow until some days after the next period was due, when there was a slight show for one day. On two subsequent occasions she had slight showing for one day. On the morning of February 13 she was taken with sudden severe pain in the lower right quadrant of the abdomen while at the toilet; she collapsed

and had to be helped to bed. She had very severe pain during the day and was admitted to the City Hospital. I saw her about 5 p. m., when she was almost pulseless, abdomen distended, hb. 41 per cent, blood pressure down to 85, pulse rapid 130+, and leukocyte count 21,000.

It was a definite picture of hemorrhage. There was nothing definite to be made out in the pelvis. It was thought the patient probably had a ruptured tubal pregnancy. We opened the abdomen at once and started submammary saline. The abdomen was filled with blood. We delivered the tube on the left side and it was perfectly normal in appearance. The tube on the other side was gone. I went back and inspected the left tube and near the isthmus of the tube there was a small rupture, but no clot about it. There was a cyst of the left ovary but it was a rather innocent-looking affair. There was also a tear in the posterior leaf of the broad ligament. There was no bleeding from any point; the patient probably was so exsanguinated that there was nothing more to bleed. We took out the tube and sutured up the broad ligament. She recovered. We gave her a transfusion as soon as we could manage it—that evening.

Microscopically there was no evidence of pregnancy. And a question arose over the diagnosis. One can't get over the fact that there was a definite rupture of the tube. Dr. Noble reported no evidence of pregnancy in this case.

Dr. A. R. Hall (St. Paul) reported a case of Brucella Abortus infection.

In the literature of the past few years there has been an increasing number of reports of cases of infection by Brucella melitensis abortus. In these reports the course of the illness has been so variable and the establishing of a diagnosis so long delayed that it seems worth while to report a case of this infection which came under my care.

Mrs. H. M., age 35 years. was confined in the Miller Hospital, by one of my associates on May 9, 1928. The delivery and convalescence were uneventful and quite free from fever.

There was nothing of note in her family history or in her own personal history.

She came to our office on July 30, 1928 (about 2½ months after her discharge from the hospital following her confinement). She stated that after her confinement she had been quite well until about one week before coming to the office, but that during the past week she had felt weak, achey all over, had a poor appetite and had chills (on inquiry these were described as chilly sensations rather than definite chills). Her temperature was 100.2, pulse 92.

On examination nothing abnormal was made out except that her spleen was palpable one finger's breadth below the costal border. The leukocyte count was 6,000 and the Widal reaction negative. She returned to her home at Birchwood, but came back on August 4, 1928, and on that date was admitted to the Miller Hospital. On admission she complained of much the same symptoms as upon her visit to the office on July 30, that is, weakness, loss of appetite, general achey sensation, and chills. Her temperature was 104.8, pulse 110. She did not look very ill, was quite clear mentally, her tongue was slightly coated but moist. No new findings were made out other than that her spleen was now palpable two fingers' breadth below the costal border. There was a mild secondary anemia and the leukocyte count was 6,100, with 45 per cent polymorphonuclears and 55 per cent lymphocytes. A blood Wassermann was negative and the Widal reaction was negative for typhoid and for paratyphoid A and B. Roentgenograms of her chest showed nothing abnormal. A blood culture taken on August 7, August 9, and again August 15, showed no growth. A search was made for malarial parasites but none were found. Blood taken on August 9, 1928, gave a definite agglutination with Brucella abortus in a dilution of 1 in 3,400, and for tularemia in a dilution of 1 in 80 (too low to have any significance).

She continued to have periods lasting 10 minutes to an hour, in which she felt very uncomfortable and chilly and which she still described as chills but in which observation showed there was no actual chill. She ran an irregular fever ranging from 99 to 104, her temperature curve never striking normal. Her pulse ranged from 90 to 120. Her appetite was poor, she vomited on one occasion only. Her bowels were somewhat constipated, the urinary output was good and free from albumin or casts. Several leukocyte counts were done. These showed a definite leukopenia. While at first the leukocyte count was 6,000, it was later 3,750, 4,400 and 4,850. This leukopenia was at the expense of the polymorphonuclear cells rather than the lymphocytes, the polymorphonuclear percentage being 45%, 37%, 43%, 46% and 41%, and the lymphocyte percentage 55%, 63%, 57%, 54% and 58% on different counts. There were never any definite joint pains and nothing resembling a neuritis. For one day there was a skin rash resembling an urticaria, but otherwise the skin was clear. The fever range in Malta fever cases is described as undulating. The fever chart in this case does not show the undulating type.

She remained in the hospital until September 6, 1928, a period of almost five weeks. Towards the end of this period there was a rather rapid subsidence of the fever. From her history she apparently had a continuous fever of about 45 days. She was then free from fever for about one week, when she again had fever for three days. After that there was no further rise of temperature and she was soon back to her former health. When examined on September 28, 1928, she appeared to be in good halth. The spleen was no longer palpable. In spite of the high fever she at no time had the appearance of a very ill patient.

The outstanding features of her illness were a long-continued fever, a pulse which was at all times good with a rate never above 120, systemic reactions which she described as chills, an appearance which at no time suggested a very sick patient, an absence of physical findings other than a palpable spleen, a mild secondary anemia, and a leukopenia in which there was a reversal of the usual relative percentage of polymorphonuclear leukocytes and lymphocytes.

After the finding of the agglutination reaction with Brucella abortus it was elicited that this woman had

been drinking a goodly quantity of milk. Investigation by the State Board of Health of the dairy herd from which she was receiving her milk, showed that 23 cows gave a positive reaction with Brucella abortus, 13 a suspicious reaction, and 25 a negative reaction.

Our difficulty in making a diagnosis was very like the story recorded in many of the case reports given in the literature. We at first thought of typhoid, paratyphoid, malaria, an active endocarditis, tuberculosis, and some hidden infection. A definite diagnosis was not made until the 11th day after she came under our observation.

DISCUSSION

Dr. F. L. Adair (Minneapolis): The relationship of Brucella abortus to the human being is rather interesting. Several years ago Dr. W. P. Larson, at the University, and I took cultures of the amniotic fluid from some dead-born fetuses and also from their stomachs in different stages of gestation in the hope that we might find the Bacillus abortus, but we did not find it. If it causes abortion in the human, it does not seem to do so with great frequency. It is rather peculiar that there were not more abortions in the herd of cattle from which this woman got her infection. Among cattle it is a very frequent cause of dead-born fetuses.

Dr. F. L. Adair (Minneapolis) reported a case of bilateral Krukenberg tumor, as follows:

M. T., private case No. 2214, hospital No. 5345. The patient was first seen in February, 1913, at which time she was 30 years old and had been married six years without ever having been pregnant. Her family history was essentially negative. Menstrual history was established at 17 years of age, had been slightly irregular, coming sometimes three or four days before time, but usually about at four weeks' intervals. The flow was scanty, lasting two days, sometimes passed clots. Has slight leukorrhea about one week before her period. Had some disturbance of urination with frequency and nocturia, also some neuritis of the right leg.

General examination revealed nothing of importance. Bimanual examination showed a rather small uterus with retroflexion-version. The adnexæ showed increased resistance, especially on the left, but no special tenderness and no masses. The case was diagnosed sterility associated with retroversion-flexion; endocervicitis. She was treated with silver nitrate for the endocervicitis and a pessary was used for some months, up until June, 1913.

There was no record of the patient subsequently until she reported to the dispensary of the Minneapolis General Hospital in March, 1928, at which time she complained of some pain in the epigastrium with nausea and vomiting. Physical examination and *x*-ray of the gallbladder and stomach were made. The gallbladder was reported normal. She had an Ewald test meal which showed the presence of hydrochloric cid. There was no blood in the feces or food. She was admitted to the Minneapolis General Hospital on July 30, 1928, at the age of 45. The complaints were as given above, pain in the epigastrium and nausea and vomiting. This present attack started on the 28th of July and continued until admission. The patient has had stomach trouble for a long time, associated with attacks of vomiting after meals, not related to any particular type of food. These attacks come on at irregular intervals, several weeks apart. When not having an attack, she had no particular pain or distress. She also complains of some pain in the back, especially on the left. This pain does not radiate from the epigastric region. She can eat almost any kind of food and is not troubled with flatulency.

The physical examination was unimportant except for slight tenderness in the epigastrium on very deep palpation; similar tenderness on deep palpation over the appendiceal region. Liver and spleen were not palpable. On deep palpation, in the hypogastric region, a mass about 10 cm. in diameter can be palpated, lying rather deeply in the pelvis and reaching about 4-5 cm. above the symphysis. This mass was not tender. The stomach was examined and the patient placed on a Sippy diet.

On August 15 an attempt was made to obtain stomach contents but none were obtained. August 25, 70 c.c. of stomach contents obtained and there was an absence of free hydrochloric acid. The patient's temperature was normal with a pulse range from 60 to 95, blood pressure 130/80.

A gynecological examination was made on August 5, at which time the following findings were reported: nulliparous external genitalia, perineum intact; no urethral discharge; both Bartholin glands slightly enlarged, but no redness around orifices. The cervix had a slight bilateral tear and pointed downward and backward. It lay to the left of the midline and felt cystic and was somewhat eroded. The corpus of the uterus seemed somewhat irregular and enlarged, rather firm, and lay to the left of the midline and anteflexed. In the left adnexal region no masses were palpable. In the right adnexal region there was a firm hard mass, which seemed to be about 5-6 cm. in diameter. This mass seemed to be adherent. The diagnosis was a lacerated cystic cervix; chronic Bartholinitis; probable small multiple fibroids; probably chronic bilateral salpingo-oöphoritis with inflammatory adnexal tumor on the right.

On August 1, an *x*-ray examination was made which showed two projections from the lumen of the stomach along the lesser curvature near the antrum. These projections are fairly characteristic of ulcer niche; one of these is fairly large and the base of the niche measures about 3 cm. A smaller niche with a base of about 14 mm. is located distal to the larger one. The appearance is fairly characteristic of multiple gastric ulcers. At six hours, there is about 25 per cent retention meal in the stomach and at 24 hours there is still some barium in the terminal ileum which is probably associated with the slow emptying of the stomach. *X*-ray impressions: multiple gastric ulcers of a penetrating type and probably benign.

During her stay in the hospital the urine examination was essentially negative. The blood examination showed hemoglobin about 65 per cent, reds 3,290,000;

white count was practically normal. Operation was advised but the patient refused and was discharged September 1, 1928.

The patient again consulted me on February 6, 1929, at which time she stated that she had noticed a firm mass in the left lower quadrant of the abdomen for two months and that she had considerable pain in the lower abdomen for the preceding week. She also had frequency of urination with no dysuria and some nocturia. She passes only a small quantity at a time. She has nausea but no vomiting, no soreness of the breasts. She also has considerable epigastric distress and flatulency. Her appetite has been very poor for the past two weeks. Her last menstrual period was October 10, 1928, and before that had been quite regular.

Physical examination was essentially negative, except for the abdominal and pelvic findings. On bimanual examination there was a rather firm, rounded, movable mass in the left lower quadrant of the abdomen, about the size of a grapefruit. There was also a large mass in the right lower quadrant extending about two fingers' breadth above the navel, firm in consistency. Vascular bruit was heard in the right hypogastric region. On pelvic examination, there was some bloody vaginal discharge. There was some bilateral tear of the cervix with irregular margins. The corpus was hard, mobility restricted, and seemed irregular in form. Bilateral masses could be felt, the larger one being on the right. These masses were not fixed and could be moved more or less independently of the uterus. Opration was advised. About two weeks later the patient was sent to the hospital. These movable masses were more distinct in the lower abdomen; she also had considerable distention of the abdomen with dullness in the flanks and demonstrable fluid waves.

A diagnosis of probable Krukenberg tumors was made and an exploratory laparotomy was advised. This was done on the 23rd day of February, at which time these masses, though somewhat adherent, were removed without great difficulty. Free fluid was evacuated from the peritoneal cavity to the amount of several quarts. This fluid was somewhat blood-stained. On exploration of the abdomen, an elongated mass could be felt toward the pyloric end of the stomach and seemed to be on the greater curvature. This mass had a somewhat irregular and granular feeling on the surface and was quite indurated. No implantations or metastases were demonstrable in the utero-vesicle or recto-vesicle pouches.

The patient has made a fairly good recovery from the operation and is still in the hospital. She now has an enlarged lymphatic node in the supraclavicular region of the right side.

DISCUSSION

Dr. D. C. Balfour (Rochester): I have never personally seen an implantation of that type from the stomach. It will be very interesting to prove that later on if it can be done.

Dr. A. Schwyzer (St. Paul): This is the largest Krukenberg tumor I have seen. They are as a rule secondary to carcinoma in the upper part of the abdomen. usually of the stomach. The question is—How does it occur? In the upper abdomen we have a constant motion by the respiration. I saw in one case how it would seem that transplantation happens. It was a carcinoma of the fundus of the gallbladder with Krukenberg tumors in the pelvis. The gallbladder fundus was white and hard and nodular. The carcinoma had come to the very surface. It rubbed against the anterior abdominal wall and one had the impression that the endothelium had become rubbed off through this friction of the respiratory motion. Thus the rubbed-off carcinoma cells would gradually wash down to the bottom of the peritoneal cavity and become implanted on the ovary, where the soil may be particularly adapted. It is interesting that these tumors are most always found on both ovaries. But why should the ovaries be a seat of predilection? We know that, in general, in carcinoma a good many cells become detached and are transported elsewhere. It was Petersen and Colmres of Czerny's Clinic in Heidelberg who studied this question of selective transplantation in cases of carcinoma of the rectum. In rectal carcinoma many single carcinoma cells were found in the capillaries of the lungs. Nevertheless, metastatic carcinoma of the lungs is a very rare occurrence in carcinoma of the rectum and is seen at most in very late cases. Thus it must be that the organism is able to take care of these cells in that particular location as long as it is not overwhelmed by them. They must become destroyed or are made inert. If such carcinoma cells then come upon a certain soil, they do not develop. For certain carcinomata of the upper abdomen the ovary must be a fertile soil and thus becomes a seat of predilection for secondary growth, probably through some biological or chemical cause.

Dr. Adair: So far as I can find there is no good explanation of the mechanism of the migration of these cells from the stomach to the ovary. It has been thought that perhaps the cells would come to lie on the surface of the ovary and start carcinoma on its surface, but further study indicates that the carcinoma seems to start on the inside of the ovary and not on the surface. If it is simply a falling down of the cells into the peritoneal cavity, one would expect it to start on the surface, but in most of the cases it occurs inside. Just why the cells should be deposited through the circulatory system to this site is difficult to explain. Of course, we do get primary carcinoma of the ovary, but a very large percentage of bilateral tumors are metastatic. There is a question as to whether or not all of these bilateral ovarian tumors are metastatic. Where ascites is also present they are usually metastatic. At autopsy the primary is very often found in the stomach, although sometimes it is found around the gallbladder and other portions of the intestinal tract.

I now have another case of bilateral cystic carcinoma of the ovaries and I do not know whether it is metastatic or not. The primary carcinoma has not been discovered. On the surface of the appendix there is a carcinomatous implantation. This patient may have carcinoma in other places, but it is not apparent clinically.

Dr. H. P. Ritchie (St. Paul) gave a lantern slide talk on Contraction of the Axilla and Contraction of the Wrist, showing method of operating on these cases.

The meeting adjourned.

Carl B. Drake, M.D.
Secretary.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

Haley M-O Co.

Magnesia-Mineral Oil (25) Haley

H. K. Mulford Co.

Perfringens Antitoxin-Mulford

National Drug Co.

Diphtheria Toxin-Antitoxin Mixture

Parke, Davis & Co.

Tetanus-Perfringens Antitoxin, Refined and Concentrated

G. D. Searle & Co.

Solution Bismuth Sodium Tartrate-Searle, 1:5 per cent

Sulpharsphenamine-Searle

Sulpharsphenamine-Searle, 0.4 Gm. Ampules

Sulpharsphenamine-Searle, 0.5 Gm. Ampules

Sulpharsphenamine-Searle, 0.6 Gm. Ampules

TRUTH ABOUT MEDICINES

Lipoiodine-Ciba (New and Non-official Remdies, 1928, p. 215).—In the form of Lipoiodine-Ciba, Diagnostic, it is used as a contrast medium in the localization of bronchial and pulmonary lesions, as a diagnostic aid in gynecology and myelography, for detecting urethral strictures, and in cavities where intensification of the roentgen ray shadows is desired. The dosage for diagnostic work is from 5 to 20 c.c. of Lipoiodine-Ciba, Diagnostic, as determined by the extent of the field to be investigated. Ciba Co., Inc., New York.

Lipoiodine-Ciba Diagnostic.—A 60 per cent solution of Lipoiodine-Ciba (New and Non-official Remedies, 1928, p. 215) in sesame oil. Ciba Co., Inc., New York.

Ampules Lipoiodine-Ciba Diagnostic, 5 c.c. — Each ampoule contains 5 c.c. of a 60 per cent solution of Lipoiodine-Ciba (New and Non-official Remedies, 1928, p. 215) in sesame oil. Ciba Co., Inc., New York.

Acidophilus Bacillus Liquid-Mulford.—A whey culture of *B. acidophilus* (Moro) in a whey medium, which contains 50 million viable organisms per c.c. at the time of sale. For a discussion of the actions and uses of bacillus acidophilus preparations see Lactic Acid Producing Organisms and Preparations, New and Non-official Remedies, 1928, p. 228. H. K. Mulford Co., Philadelphia. (Jour. A. M. A., March 2, 1929, p. 723.)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Meeting of Jan. 3, 1929.

The regular monthly meeting of the Minneapolis Surgical Society was held at the Minneapolis General Hospital, Thursday, Jan. 3, 1929. Dr. S. H. Baxter, president, in the chair.

Dr. F. A. Olson presented the following three cases:

Case 1.—Patient is a white male, aged 44, railroad laborer, who was admitted to this hospital September 11, 1928, complaining of a swelling of his abdomen and soreness in his right upper quadrant. For three weeks previous to his admission patient was troubled with a dull ache in the pit of his stomach which always occurred two or three hours after he had eaten. Associated with this, patient had a good deal of belching and obtained relief by taking soda. Shortly after the onset of his trouble patient drank some moonshine which nauseated him and he vomited material containing considerable bright red blood. Previous to this, patient had never vomited any blood. Patient was forced to lay off work because of the swelling of his abdomen.

Past history: The past history reveals the fact that for years the patient had a burning sensation in his stomach, especially after eating, and relieved by soda bicarbonate. The patient has been a heavy alcohol drinker all his life.

Physical examination on admission: Essentially negative except for moist râles in bases of both lungs posteriorly, and for an abdomen that was very distended, with a protruding umbilicus, distended bluish veins over anterior abdominal wall and with dullness to flatness in both flanks. The extremities present considerable edema of both legs and ankles, with brownish macular lesions scattered over both anterior tibial surfaces. Spleen palpable 2 cm. below left costal margin.

Laboratory: Sept. 13, 1927. Urinalysis: essentially negative. Blood study: hemoglobin 58 per cent. RBC 2,800,000. WBC 2,500. PMN 70 per cent. Lymphocytes 28 per cent. Eo. 2 per cent. Wassermann negative. Dec. 12, 1928. Van den Bergh: Direct immediate —negative. Direct delayed—positive. Indirect reaction —positive. Icterus index—15.6. Blood chemistry, Dec. 12, 1928: Creatinin 1 mg. Urea N. 5.7 mg.

Liver function test: 1st specimen: 45 per cent retention ½ hour (Normal 15%); 2nd specimen: 50 per cent retention 1 hour (Normal 15%). Marked loss of liver function.

Ascitic fluid: 6 cells (4 p.m.n. and 2 lymph.) sp. gr. 1,010. Coagulum negative.

X-ray of chest: Both domes of the diaphragm elevated. Hilus areas moderately enlarged. No parenchymal pathology.

Patient requires a paracentesis about every 6 to 10 days, at which time 6,000 to 10,000 c.c. of fluid are removed.

Very little advance has been made in the etiology of cirrhosis and more recently the idea that alcohol is entirely at the base of cirrhosis has been sort of laid aside. The exact cause of ascites is not known. This man has been in for quite a little while and we have had some opportunity to study him. When the ascites increases, so that his abdomen is considerably distended, he gets a marked congestion of both lung bases from pressure together with an edema of both lower extremities. Frequently at the time that he has been tapped they have used a good sized trochar and he has had an infection of the abdominal wall. He has quite a few distended veins but none as large as you often see in cirrhosis. The patient is feeling much more comfortable now. It is remarkable the benefits he gets from tapping. He feels better and stronger in every way and the edema disappears. When it comes to treatment there isn't a great deal to say. Practically every known type of surgical treatment has some cure to its credit. The Talma-Morison is the one operation that has stood the test through all these years and the results of that aren't any too good. At a Clinic down South they do a number of splenectomies in connection with the Talma-Morison. I don't think they are as favorable to it as they were at one time. This patient is being prepared for operation. We have tried in our preparatory treatment to keep the abdominal fluid down to the very minimum. If I was going to operate I would keep the ascites down for several days previously and I believe that I would give this man some calcium with the idea that these patients have a calcium deficiency. Also I believe I would give enough sugar so that he would have a good store of glycogen with the idea of increasing his resistance. We know this factor is very low because ordinarily we do not get infection of the abdominal wall from paracentesis.

Case 2.—This is patient's second admission to the hospital. He is 67 years old and he was here four years ago. He complains of pain over the entire abdomen and back, shortness of breath, cough, and swelling of ankles. Present attack started about December of last year, when the pain became very severe over the entire abdomen. Patient began to cough, ankles became swollen, abdomen became distended and he developed a severe diarrhea which incapacitated him and caused his admission to the hospital. Patient had an injury to the liver about 20 years ago. He dates all his trouble back to that trauma, at which time he was struck by a pitchfork over the upper abdomen. Although there was no external evidence, patient developed a mass over the liver area several months following the accident.

On examination at time of admission there was congestion at both bases, with the heart slightly enlarged and to the left. Blood pressure 140-80. Abdomen did not show any dilatation of the superficial veins. There was a fullness which on percussion proved to be dullness and definite fluid wave could be made out. The liver was thought to be smaller than normal. Spleen could not be palpated. The ankles were swollen. No murmur over the heart. Temperature and pulse normal. Respiration normal. Findings were definitely characteristic of cirrhosis of the liver, cardiac decompensation, and possible gallbladder involvement.

Going back into the past history he has both a quantitative and qualitative food disturbance. With these points in view the various laboratory tests were made. *X*-ray of the gallbladder was taken and a diagnosis of a non-pathologic gallbladder was made. X-ray of the lungs: Lungs and heart were found to be within limits in size, shape and position. Electrocardiogram of the heart was normal. Hemoglobin 65 per cent. RBC 3,600,000. Wassermann negative. Urine negative. Liver function test was made which showed a 60 per cent retention at the end of 10 minutes. Van den Bergh was negative. Blood chemistry: Urea 8; carbon dioxide 50 per cent. His congestion at both bases has cleared up. Edema has cleared up under digitalis and various cardiac drugs. This patient has not been given novasurol. The medical staff feel that this is not a gallbladder disease but a condition of the liver.

The diagnosis was more probable by ruling out the cardiac and gallbladder condition as cause of edema and pain. The abdominal pains are of a vague type and never were localized. He has given a history in the past of having some blood in the stools but that isn't definite. He did have edema of the feet and ankles which has now disappeared under cardiac stimulants. He has slight amount of ascites at present. There is gastric disturbance after fatty foods. He was here four years ago and a diagnosis of cirrhosis of the liver was made at that time.

Clinical diagnosis is not always exact and in certain instances you can not be absolutely sure of an alcoholic cirrhosis after a section of the liver. The diagnosis is fairly well established in the ordinary operation but clinical diagnosis is often difficult. You may see a case that seems to be quite definite and it may prove to be something entirely different. Ascites is more or less of a misleading complication and it is interesting to note that Doctor Cabot reported some 80 cases and his diagnosis was correct in only 30 per cent. In reporting 5,000 cases of ascites he had some 230 cases of cirrhosis and together with that there were a number of tuberculous peritonitis cases, cardio-renal cases, and miscellaneous, so that the diagnosis is not particularly easy.

Case 3.—This patient is 62 years of age now and he has had this tumor for the past six years. During the last six months there has been considerable increase in size. It started with more or less of a small nodule on the lateral surface of the thigh and there has been a gradual increase in size. He came in here on the medical service and has a marked cardio-vascular renal disease. He has recently had all his teeth out, so that surgery of the tumor has been delayed. *X*-ray shows calcification in the original tumor probably in a small hematoma. We have had an opportunity to observe this for quite a little while. We have considered lipoma. Doc-

tor Wilcox suggests cystic osteofibroma. Doctor Bell saw this case and he suggests lipoma. I believe we will have to definitely decide the issue through a biopsy.

Dr. E. A. Regnier presented the following two cases:

Case 1.—I want to show this man for just a moment. I like to show him, because he is the kind of a case you enjoy seeing around. I operated on him a year and a half ago for practically a complete obstruction of the stomach. He is now perfectly well, weighs more than he ever did and works every day. He has to eat four or five times a day and he doesn't tolerate greasy foods very well. He had had symptoms of obstruction for two weeks. (Above remarks were made before the patient.)

This patient was imported from the Philippine Islands by a wealthy family in Minneapolis when sixteen years of age. He is now forty-one. He is employed as a chauffeur. He was referred to me by a physician with a diagnosis of obstructive lesion of his stomach. The x-rays showed practically a complete obstruction by a malignant lesion. He complained of pain in his epigastrium, nausea and vomiting. For two weeks the pain was almost constant. At operation the stomach showed a lesion in the pre-pyloric region, involving the lesser curvature and a portion of the greater curvature just above the pylorus. The lesser curvature was all puckered on itself so that the stomach looked very small. There was a large crater and the lesion was very hard. I did a partial gastrectomy, removing about two-thirds of his stomach. At first he had to eat six or seven times a day, now he gets along on four or five meals a day. At operation there were some very large nodes down in the pancreas, which were removed. The pathologist first thought they were tuberculous because they had completely broken down, but sections showed cancer. This man is not cured, but has been perfectly well since the operation and able to do his work. I chose to do a partial gastrectomy rather than a gastro-enterostomy, because experience has shown that these patients, even though the hopes of cure are remote, are more comfortable with this type of operation than with the palliative gastro-enterostomy. If there is a recurrence, it will most likely be outside of the stomach, and therefore the patient will not have obstructive symptoms. As to whether or not life will be prolonged for a longer period by a gastrectomy is a matter of conjecture. The eighteen months of perfect health which this patient has enjoyed surely justified the procedure.

Case 2.—I have seen this patient a few times, although I have not made a very close study of his case.

In reviewing the literature on the subject of cirrhosis, one is impressed with the infrequency of correct diagnosis. In the case reports of Johns Hopkins University, as reported by Hughson, only 39 per cent of cases so diagnosed could be confirmed by autopsy. His conclusions were that actual diagnosis of cirrhosis could only be made by sections of the liver. As to the question of treatment, there is a diversity of opinion by writers on the subject. They all agree that if surgery is to be done, it should be done early. Unfortunately very few of these cases are seen by a surgeon in their early stages. Medical men have been reluctant to turn them over for surgery, because the results have not been good. In the Johns Hopkins series the longest time a patient lived following operative procedure was four and one-half years. The Mayo Clinic reports one case living nine and one-half years, after operation. The Talma-Morison operation or some modification of it, is the operation usually employed. Occasionally a splenectomy is also done. A splenectomy will ordinarily divert about one-eighth of the portal circulation. Surgical interference, however, is simply a means of doing away with the ascites; in other words, it is treating a symptom. Under normal circumstances the peritoneum will absorb a tremendous amount of fluid. In a great many cases of cirrhosis, autopsy shows the omentum to be from 2 to 4 mm. thick, especially in the lower abdomen, apparently the result of a chronic peritonitis, so we not only have a peritoneal lining which does not absorb but in turn probably secretes fluid. The Talma-Morison operation, while it may not prolong life, usually, if successful, will certainly add a great deal to the patient's comfort, even though it does nothing to arrest the pathological process. The spleen in this case is definitely enlarged and could be felt after the fluid was removed.

The question of treatment in this case in his present condition is still rather doubtful. I am open to suggestions.

Dr. A. E. Wilcox presented a case of repair of esophageal defect. (See Minn. Med. 12:174, March, 1929.)

Dr. H. O. McPheeters read a supplementary report on "Injection treatment of varicose veins" (to appear soon in Surgery, Gynecology and Obstetrics).

DISCUSSION

Dr. J. M. Hayes: I don't take the credit for originating this form of treatment in Minneapolis that Dr. McPheeters has kindly attributed to me. Kretchmer, who came from Germany to Red Wing and then to Minneapolis, was the man who started the enthusiasm over this work in this state. About six years ago patients who had been treated by him but were not financially able to pursue the treatment applied for treatment at the out-patient department of the University. We had no experience in this work up to that time but on investigation we found that Linser of Germany had been doing this work since 1911. He had done the work there very extensively and reported it very favorably in 1917.

Up to that time Linser had used only a 1 per cent solution of bichloride of mercury, injecting only 1 c.c. at each sitting. After a study of many thousands of injections he concluded that there were no serious results except through blunders. The only fatal report was that of Hammar (1919). He followed the Linser method but used more than the amount suggested by Linser; in other words, he used a toxic dose.

Sicard of France wrote on the use of a 20 per cent solution of sodium salicylate for this purpose in 1922.

Genenvier of France in 1923 wrote on the use of quinine and urea hydrochloride and urethane as a sclerosing solution for the obliteration of varicose veins.

In 1925 Linser suggested a 15 to 25 per cent solution of sodium chloride. He expressed the opinion that this had many advantages over bichloride of mercury. Noble of Vienna in 1926 wrote on the advantages of an invert sugar as a sclerosing solution for varicose veins.

It is interesting to go from one country to the other in Europe and observe the enthusiasm shown by these various men, each determined that his solution is the one of choice for this purpose.

During the past six years, I have done nearly 4,000 injections of bichloride solution and still find that in selected cases it is the solution of choice. When very large veins are present one of the other solutions will frequently give a more rapid obliteration. For the past two years we have used all the above named solutions, and while I think they are all good, I do not find that any one has such distinct advantages over the other as we might be led to believe from the enthusiasm of some of the pioneers.

In six years' use of this method I have had no serious results. Only two patients have had to go to bed following injection, one for six days and one for two days. I have had 8 or 10 sloughs, but they have not been serious and have all healed nicely.

In contrast to McPheeters' method of making a large number of injections at one sitting I believe in being more conservative. I seldom make more than three injections at one sitting.

While there are a few cases of emboli reported in this method of treatment, I believe we are increasing the chances for such results by a large number of injections at one sitting.

I am convinced that this method of treating varicose veins is preferable to surgical removal.

Dr. McPheeters has given us an excellent demonstration of the course of the blood stream, or rather the stagnant condition of the blood in varicose veins, by this injection of lipiodol. Sicard brought this same point out some time ago by injecting sodium iodide into the veins and catching the course of the flow on radiographs.

Theodore H. Sweetser, M.D.
Secretary.

SODIUM BICARBONATE AND CALCIUM CARBONATE FOR ALKALIZATION OF URINE

Both sodium bicarbonate and calcium carbonate are effective antacids as far as the gastric secretion is concerned. However, sodium bicarbonate is much more efficient in aiding in the alkalization of the urine than calcium carbonate. The reason for the difference lies in the fact that sodium salts, such as bicarbonate, are freely absorbed by the intestine. On the other hand, calcium carbonate itself is not susceptible of absorption. Sodium bicarbonate may be freely used to the extent of actual alkalization of the urine, though it may take as much as 30 Gm. or more. (Jour. A. M. A., March 9, 1929, p. 831.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

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CHRONIC APPENDICITIS FROM THE VIEWPOINT OF THE INTERNIST: Harry Wald Bettman, Cincinnati, O., Annals of Internal Medicine, Vol. II, No. 6, Dec., 1928). Chronic appendicitis is in no way to be confounded with recurrent appendicitis. Recurrent appendicitis at the time it is observed is in reality an attack of acute or subacute appendicitis. If judged by clinical results, the total number of operations for chronic appendicitis yield disappointing results in 40 per cent of the cases, and investigation reveals the fact that nearly 60 per cent of the patients who have had an unsuccessful appendectomy had received no adequate study before the operation was decided upon.

According to Willis, the mortality in cases of gall stones and appendicitis has mounted continuously from 1900 to 1922. From 1905 to 1921 the death rate from surgical diseases of the kidney diminished 11 per cent; and from pelvic diseases, 26 per cent. The death rate from gastrointestinal ulcers increased 72 per cent; thyroid disease, 250 per cent; and from appendicitis almost 31 per cent. The percentage of deaths from appendicitis per 100,000 population increased in every five-year period from 1901 to 1922. The mortality in 5,664 cases was 1.68 per cent. The increase in mortality is attributed to the fact that the operation is not considered serious and is frequently done by an incompetent surgeon. Further statistics show that in a study of 300 patients unsuccessfully operated upon for chronic appendicitis, 35, or 11.6 per cent, were made definitely worse by the operation.

One of the most serious complications is adhesions of various types, involving the omentum, the ileum and the cecum. One of the common sequelæ of appendectomy is ileac stasis. The author is convinced that ileac stasis is a distinct clinical entity; that it has a fairly characteristic clinical history, and that it can be recognized by appropriate x-ray observation. In ileac sta-

sis barium can be demonstrated in the terminal ileum 12 to 14 hours after administration, and in severe cases even 24 or more hours later.

The author refers to the "furor operandi" of ambitious surgeons as being the main cause of needless appendectomies, and their chief aid and abettor is the roentgenologist. He cites many examples of the differences of opinion as to what constitutes a pathological appendix and what is normal.

The simulation of chronic appendicitis by enterospasm and by intercostal or costolumbar neuralgia is discussed, and particularly the work of J. B. Carnett on "Intercostal Neuralgia as a Cause of Abdominal Pain and Tenderness." The author feels that essential enterospasm, enterospasm from lesions in the distal colon, rectosigmoid and rectum, and finally costolumbar neuralgia are all actual clinical entities.

Finally he makes a plea for a more prolonged and careful study of the individual patient, and deplores the fact that one of the serious shortcomings of our present medical and surgical methods is the quick diagnosis.

Richard Bardon, M.D.

LEUKOPLAKIA IN A DIVERTICULUM OF THE BLADDER: Henry G. Bugbee, M.D. (Jour. of Urology, Vol. XXI, No. 3, 1929, 395-399). The author calls attention to the more frequent diagnoses now being made of bladder diverticula. These he believes have been occasioned by an earlier resort to the precise methods of urologic diagnosis. A survey of the literature on diverticulum of the bladder shows but two reported cases in which leukoplakia were found in a diverticulum without involvement of the bladder itself.

The findings are cited in a male patient, forty-four years of age, who presented himself for examination because of pyuria that had been noted during the course of a routine examination for life insurance. Questioning revealed the presence of mild frequency and obstruction of several years' duration. The prostate was not enlarged. There were 6 ounces of residual urine. Cystoscopic examination showed a congested, trabeculated bladder wall. Two centimeters posterior to and to the outer side of the right ureteral meatus there was an opening 1.5 cm. in diameter leading into a diverticulum which had a capacity of 8 ounces. An X-ray catheter was coiled up in this diverticulum and a roentgenogram made.

After three weeks' preparation on an indwelling urethral catheter the diverticulum was resected. The pathological examination of the specimen showed a leukoplakia of the bladder.

Leukoplakia is almost always associated with long continued chronic infection, is slowly progressive, and the only cure is by excision. Its principal importance is that it is apparently a necessary preliminary to squamous cell carcinoma, and the possibility of its occurrence in a diverticulum of the bladder argues for the early resection of a bladder diverticulum.

John R. Hand, M.D.

SURGERY

SUPERVISORS:

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WHEN AND WHEN NOT TO OPEN THE ABDOMEN IN ACUTE SURGICAL CONDITIONS: John B. Deaver, M.D. (Annals of Surgery, LXXXIX, No. 3, 340-353). The first step is to decide whether or not a given case of abdominal disease is surgical. This decision represents one of the niceties of surgical judgment. Acute abdominal conditions resemble each other more or less, so that, oftentimes, opening the abdomen is the only means of determining the seat of the disorder. The important thing is to recognize that operation is demanded and to act upon that knowledge, not to watch and wait, but to look and act.

Without doubt the most common ailment in the aforementioned class is acute appendicitis. Its mortality still remains entirely too high. In trying to place responsibility for this unsatisfactory record, it may be said to be divided between faulty diagnosis and either precipitate or procrastinating surgery. Abdominal pain, tenderness, and a certain amount of rigidity of muscles in the lower right abdomen, nausea, vomiting, constipation or, sometimes, diarrhea, should be enough to arouse suspicion of the nature of the disorder. The modern trend is to depend upon the leukocyte count to clinch the diagnosis. To the author the degree of tenderness is much more decisive than the degree of leukocytosis. The time to open the abdomen where the appendix is suspected is before peritonitis has developed. If that moment has been missed, then waiting for localization of the peritonitis, if diffused, is often best. While deaths caused by acute appendicitis are primarily the result of appendiceal disease itself, secondarily they are the result of peritonitis and the toxemia which it causes.

In acute appendicitis, in the presence of peritonitis, the pith of the question is when and when not to open the abdomen to obtain the best results and the minimum mortality. The author believes that, in the absence of a forbidding peritonitis, a patient with acute appendicitis should be operated upon immediately, except in the presence of some grave constitutional condition. He furthermore states that the occasional operator should not be the one chosen to do the work, but the operator of vast and varied experience in dealing with the pathologic abdominal riddles, as he can best deal with any of the many complications that may be present.

In circumscribed appendiceal peritonitis with the abscess close to the ileo-cecal junction, with the terminal ileum having lost to a great degree its contractile power, after the pus is evacuated, the appendix removed and drainage established, an ileocolostomy, or, some-

times, an ileo-cecostomy, will make recovery more certain, in that it prevents obstruction immediately or later.

In the diffusing peritonitis, which is spreading inflammation not involving an extensive area, there is both peritoneal irritation and inflammation. In cases of diffusing or spreading appendiceal peritonitis patients should be operated upon early, which may prevent the spread of peritonitis.

The author presents the picture of diffused appendiceal peritonitis, in which twenty to forty hours after the onset of the peritoneal inflammation the picture changes to one of general abdominal distention, much less pronounced rigidity, tenderness not nearly so decided, absence of peristalsis, and finally a silent abdomen and so forth, presenting a condition which is usually considered hopeless. However, recovery with local abscess formation may occur, the simple evacuation of which is followed by convalescence.

A condition that requires keen diagnostic and surgical judgment is acute intestinal obstruction. An important aid to the diagnosis is the history of a previous operation. In the presence of an abdominal scar, the result of a previous abdominal operation, in a patient suddenly stricken with acute intermittent abdominal pain, one should first think of intestinal obstruction. Its usual characteristics are: sudden onset of intermittent colicky pain, persistent vomiting, normal pulse rate and usually normal, but sometimes subnormal, temperature, contraction of the affected bowel, as evidenced by early stormy peristalsis with visible coils, and later absence of peristalsis. The differentiation between the various forms of obstruction is not of moment. Of most moment, is to get into the abdominal as early as possible and to get out as soon as possible.

In children intussusception should be considered with the signs of obstruction, bloody stools, and the presence of a tumor on rectal or abdominal examination. These cases demand immediate operation.

Of the acute diseases of the lower abdomen, those of the pelvis are the ones that most frequently arouse the question of when to operate and when not to operate. In general, acute puerperal infection had best be treated symptomatically by anatomic and physiologic rest unless drainage is indicated. Acute salpingitis, especially in the unmarried female, and, also, when due to gonorrheal infection, likewise does better under expectant treatment unless complications occur.

The abdomen should be opened at the earliest possible time in cases of ovarian tumor, or a uterine fibroid twisted on its pedicle, or bleeding caused by a ruptured cyst of the ovary, ruptured ectopic pregnancy, placenta previa, accidental hemorrhage in the pregnant woman, ruptured uterus, and perforation of the uterus, accidental or otherwise.

In the upper abdomen the most frequent cause of acute symptoms is an inflammation of the gallbladder. Such a condition, if ultra acute, whether phlegmonous, perforative, or gangrenous, demands immediate operation as soon as the diagnosis is made. In cases of acute, especially non-calculous inflammation, with very few exceptions, operation should not be considered until the active stage has passed, since the attack will subside under anatomic and physiologic rest.

In subacute perforated peptic ulcer, which is most often duodenal, the abdomen should not be opened immediately, for two reasons: First, this type of lesion is, in most instances, difficult to diagnose; secondly, it is usually taken care of by a protective peritonitis, during the active stage of which operation has more hazards than if made when the peritonitis has subsided and the general peritoneal cavity is well protected. In this latter stage a posterior gastro-enterostomy can be safely made without in any way disturbing the site of the lesion. These are not emergency cases, unless seen immediately after the perforation has taken place, when the diagnosis is not certain.

A common abdominal catastrophe is acute perforated peptic ulcer. The diagnosis is made by the history, if one can be elicited, and, when this is not obtained, by the sudden onset of pain, making its appearance like lightning out of a clear sky, immediately followed by board-like rigidity of the abdominal walls, that are tender. It matters not whether the perforating ulcer is duodenal, gastric or marginal, there is only one road to the goal, and that is the operative route. All patients, barring a very few cases, will get well if operated upon within the first few hours, while they will all die if operated upon too late.

In the presence of a central upper abdominal swelling with overlying rigidity and exquisite tenderness occurring suddenly, particularly in an obese subject past middle life, who, besides being shocked, is more or less livid, with a small, rapid pulse, persisting retching, or vomiting, acute pancreatitis should be considered, and the abdomen should be opened. In this condition an operation cannot be performed too early, but too late.

A condition with a dramatic onset is mesenteric thrombosis—an acute condition of the abdomen, in which, with few exceptions, the diagnosis is not possible without opening the abdomen.

In conclusion, the author refers to a few of the traumatic conditions in which the abdomen should be immediately opened, namely, rupture of the liver, the spleen, the pancreas, the small intestine, and the bladder. The severity of the symptoms and physical signs in these cases depend upon the extent of the injury. When the injury is slight, the evidence of shock, hemorrhage, and muscular rigidity is not so pronounced as in reverse conditions; the sign always present, however, is muscular rigidity caused by intraperitoneal irritation. This alone justifies the immediate opening of the abdomen.

Verne C. Hunt, M.D.

THE MANAGEMENT OF URETERAL INJURIES WITH A DISCUSSION OF THE SURGICAL INDICATIONS IN PATIENTS WHO REQUIRE URETERAL TRANSPLANTATIONS: Arthur H. Curtis, M.D., F.A.C.S., Chicago, Ill. (Surg., Gynec. and Obst., Vol. XLVIII, No. 3. March, 1929). The author divides surgical injuries of the ureter into two groups: first, those recognized at the time of operation; and, second, those first recognized during convalescence.

If the division occurs during an unusually prolonged or difficult case, in which there is normal renal function on the opposite side, Curtis recommends ureteral ligation without any attempt at transplantation or repair.

In cases, in which the surgical risk does not contraindicate additional operative procedure and also in those difficult cases in which there is deficient renal function on the uninjured side, either ureteral transplantation into the urinary bladder or end-to-end anastomosis of the ends of the severed ureter is advised. Transplantation of the severed ureter is the operation of choice under these circumstances, but when the severed ureter is so short that it cannot be implanted into the bladder without subjecting it to undue tension, end-to-end anastomosis is indicated. The union of the ends of the divided ureter is made over a snugly fitting ureteral catheter which may emerge above from a stab wound in the flank or may extend downwards into the bladder. Curtis emphasizes the necessity of providing drainage of urine above the site of anastomosis and accomplishes it by the introduction of a second ureteral catheter through a slit in the ureter above the site of anastomosis. Both tubes are removed within eight to ten days.

When the injury is recognized during the patient's convalescence the procedure indicated varies in the individual case. Curtis recommends careful observation of the patient over a period as there is a tendency towards spontaneous cure due to the gradual development of ureteral stricture. If this fails to occur, the features of the case will determine the type of surgical interference necessary.

Curtis believes that intestinal transplantation is indicated mainly in those cases in which there are definite pathological changes in the bladder which interfere with its function of storing urine. In unilateral ureteral injury either implantation of the severed ureter into the bladder or end-to-end anastomosis of the ends of the divided ureter is the preferable procedure.

C. M. Spooner, M.D.

THE TREATMENT OF INTESTINAL OBSTRUCTION: Thomas G. Orr, M.D., and Russell L. Haden, M.D. (Annals of Surgery, LXXXIX, No. 3, 354-358). A discussion of the treatment of acute intestinal obstruction may be divided into five parts:

1. Removal of the mechanical obstruction. 2. Relief of dehydration. 3. Relief of hypochloremia. 4. Relief of starvation. 5. Drainage of the small bowel (enterostomy).

If recognized sufficiently early before alteration in the chemistry of the tissues and fluids, operation for the direct relief of the obstruction or strangulation will undoubtedly result in the cure of a high percentage of cases. Unfortunately, many cases are not diagnosed early and present themselves for treatment with the disease far advanced and much damage already done. In most cases operation may be done, with good judgment, only after the patient had received large quantities of water, salt and glucose to relieve the dehydration, hypochloremia and starvation.

Dehydration soon becomes extreme if the small intestine is obstructed. During the acute illness no less than four to six litres of liquid should be given every twenty-four hours. In extreme cases this should be increased. No harm can be done if water is given as long as thirst exists. Water should always be given as salt solution. In the hypochloremia of intestinal obstruction the administration of sodium chloride is an essential part of the treatment. The blood chlorides may be reduced as low or even lower than half the normal. As the disease develops there is a rise in urea and non-protein nitrogen of the blood and usually a rise in the carbon dioxide combining power. Sodium chloride, given in salt solution, tends to restore the chemical changes of the blood to normal.

To treat hypochloremia properly it is necessary to administer sufficient salt solution to return the blood chlorides to normal; the quantity varies with different patients and should be governed by frequent blood studies.

Before any operation is done every patient seriously ill with intestinal obstruction should be given preliminary treatment with salt solution. By using hypodermoclysis and intravenous injection, 3 to 4 litres of water and 50 to 75 grams of sodium chloride may be given in two to four hours. Salt solution may be given safely in 2 per cent solution under the skin, and 5 per cent in the veins if given slowly. After operation salt solution should be given until the patient is out of danger.

The need of food to furnish energy becomes an important factor after the patient has been ill for several days. It is advisable to begin the intravenous administration of glucose early in the disease and continue until the patient can take food by mouth. It may be given slowly in 10 to 25 per cent solution.

There is some difference of opinion in regard to the value of enterostomy in the treatment of acute intestinal obstruction. Enterostomy low in the small bowel is of undoubted value in properly selected cases. Prompt relief from pain, nausea, and a sense of oppression is often noted by the patient soon after the bowel is drained.

Verne C. Hunt, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

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ACUTE ACCESSORY SINUSITIS AND ITS MANAGEMENT: Thomas J. Harris, M.D., New York (Annals of Otology, Rhinology and Laryngology, Dec., 1928, XXXVII, 4, 1094). This is a very comprehensive review of acute paranasal sinus infections and the author discusses the history, anatomy, classification, bacteriology, pathology, symptomatology, diagnosis, prognosis, and treatment of the condition. This abstract will deal only with the treatment.

He divides the treatment into Preventive and Curative. Preventive treatment seeks to remove the causative factors, chief of which are nasal abnormalities which cause obstruction to proper ventilation and drainage. The most common form of obstruction is a high deflection of the nasal septum which presses on the middle turbinal. When this abnormality exists the nose is in a stage of chronic inflammation and is the reservoir of germs ordinarily dormant, but which become active if some exciting cause, such as a disordered intestinal canal, exists and arouses them. Proper nasal surgery is likely to be of great benefit here.

Curative treatment consists of relief of pain and promotion of drainage. The coal tar products are especially indicated here. The application externally of heat or cold, sometimes one, sometimes the other, is good. The Bruning light bath is the most satisfactory method of applying heat. The author advises atropin sulphate gr. 1/100 internally three times a day. A dose of castor oil followed by an enema will stimulate elimination. The lack of drainage is usually due to swollen ostia and middle turbinals. Therefore it is desirable to contract these tissues. Adrenalin and cocain have long been used but adrenalin is so transitory in its action and its resulting engorgement so detrimental that it is best not used. Cocain applied only in a weak solution and always by the rhinologist will prove beneficial. Recently ephedrin in the form of a spray has proved very efficacious. After shrinking the mucosa the nose should be thoroughly cleaned; a warm saline irrigation may be used followed by suction. The nasal pack containing one of the synthetic silver preparations may be allowed in place from 10 to 15 minutes. This treatment may be repeated once or twice daily. Operation should be resorted to only in the fulminating cases. The author mentions antrapuncture only to say that he does not approve of it as a routine procedure. If necessary he irrigates through the natural openings. He uses hot normal saline for the irrigating solution. He cites Davis' experience with vaccines but has not used them himself.

ARTHUR C. DEAN, M.D., F.A.C.S.

LARYNGEAL STENOSIS, ITS RELATION TO TRACHEOTOMY: Gabriel Tucker, M.D., Transactions of the American Laryngological Association, 1926*. Tracheotomy is both a cause and a cure of laryngeal stenosis. The most frequent causes of laryngeal stenosis are high tracheotomy or improperly performed tracheotomy. In acute stenosis, on the other hand, tracheotomy below the second ring puts the larynx at rest and results in a cure in a great majority of cases. In chronic stenosis of the hyperplastic or cicatricial type, tracheotomy is again the best method of treatment, especially in cases wherein the laryngeal aperture is of sufficient size to permit bouginage.

Jackson's enumeration of tracheotomic causes of laryngeal stenosis is as follows:

"1. Hasty operation.

2. Attempts at general anesthesia that result in respiratory arrest and stabbing operation.

3. High tracheotomy, even when classically done.

4. Division of the cricoid cartilage.

5. Sewing up the tracheotomy wound.

6. Improper postoperative care.

7. Wearing of a cannula of improper size or shape or material or one with a fenestra.

8. Neglect of ordinary decent cleanliness in the wearing of a cannula."

The cross-section area of the larynx at the level of the vocal cords is about half the area below the level of the first ring. Therefore if a cannula is used which has a cross-section area approximately equal to that of the glottis, the trachea at this point having twice this area, air can pass freely *around* the cannula and normal breathing and phonation is thus restored in acute cases. Further, with the cannula in the low position the larynx is at rest—an essential factor in recovery from acute conditions. In chronic cases the cannula in this situation does not interfere with peroral bouginage.

In recurrent papillomata of the larynx tracheotomy occasionally serves to prevent recurrences. In ulcerative stenosis, due originally to diphtheria and aggravated by long intubation, proper tracheotomy leads to healing of the ulcers, disappearance of the inflammatory thickening of the subglottic tissues, and usually to a final cure. Great care must be taken not to use a cannula which is so large and fits the trachea so tightly as to prevent the passage of air upward through the larynx, or to cause perichondritis of the tracheal cartilage. A duplicate cannula must be secured so as to facilitate daily change and cleansing. Perichondritis may also occur in the thyroid or cricoid cartilages due to high tracheotomy. Moving the cannula from this position to an incision in the third, fourth and fifth rings, together with external drainage of the abscess if any is present, usually leads to recovery.

A long, vertical midline skin incision, from the thyroid notch to the suprasternal notch, is necessary for a proper tracheotomy. The wound is not sutured, to avoid deep infection in the neck, closure taking place by granulation. VIRGIL J. SCHWARTZ, M.D.

*This abstract is made from a reprint sent to the author personally. Attempts to find the volume and page number in the transactions of the American Laryngological Association for 1926 have proved unavailing and for this reason this information cannot be given.

ROENTGENOLOGY

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ACUTE MASSIVE COLLAPSE (ATELECTASIS) OF THE LUNG: David R. Bowen (Am. Jour. Roentgenology, Vol. XXI, 101-136). In this extensive review of the literature on atelectasis, the fact is repeatedly emphasized that this condition is not chiefly a surgical but a common medical complication, which must always be considered whenever pulmonary pathology is suggested. The causes are divided into two groups: (1) those external to the lung, and (2) those within the lung. The latter group is now considered the dominant factor in the production of atelectasis. Upper-respiratory infections, the use of morphine and atropine, anesthetics, and the position of the postoperative patient are cited as predisposing factors.

In regard to diagnosis, a moderate elevation of temperature, rarely above 102° F., is the most important symptom, while the displacement of the heart toward the affected side is the characteristic and diagnostic physical finding. The roentgen film is usually characteristic, the heart being displaced toward the involved side, the diaphragm being raised abnormally high, and more or less of the lung being apparently consolidated. The condition clinically has a great many points in common with lobar pneumonia, and is often associated with it. When clinicians will "think atelectasis" and look for it in all pulmonary conditions, it likely will be found to be a much more frequent medical than surgical complication.

As a post-operative condition, the onset is usually within 24 to 72 hours following the surgical procedure, and the duration is from a few hours to four weeks. The prognosis is usually favorable.

Surgical prophylaxis consists in the prevention of upper respiratory infections, limitation of morphine and atropine, semi-erect postoperative position, with frequent change of posture as soon as the surgical procedure will permit it. After the onset, procedures should be directed toward removal of the bronchial obstruction by posture or bronchoscope.

Atelectasis should be recognized as an important medical complication, which should routinely be sought for as regularly as tuberculosis or other pulmonary conditions. The clinician is repeatedly advised to "think atelectasis."

H. Hillstrom, M.D.

THE ROENTGEN RAY DIAGNOSIS OF INFANTILE SCURVY: Ralph S. Bromer (Am. Jour. of Roent. & Rad. Ther., XIX, Feb., 1928). Bromer reviews the literature of infantile scurvy. He points out that the diagnosis of this condition can be made clinically, but that it can be conclusively established roentgenologically.

The gross pathology may consist of the following: (1) subperiosteal hemorrhages; (2) epiphyseal separations or infractions of the adjacent diaphyseal margin; (3) marked atrophy and thinning of the cortex of long bones with widening of the medullary canal; (4) the presence of a yellow marrow at the ends of long bones. The latter constitutes one of the typical lesions of scurvy.

Microscopic pathology reveals a distortion of the proliferating cartilage cells, with absence of mitosis. The zone of temporary calcification becomes several times broader than normal, and is well calcified. Proximal to this zone is a zone of greatly weakened new bone which corresponds to the yellow marrow zone. The epiphyseal centers show similar changes.

Roentgenologic changes are definite, namely (1) a band of dense calcification just at the extremity of the shaft, corresponding to the broadened zone of temporary calcification; (2) next to this on the side toward the shaft, the area of greatly weakened new bone which is represented by a zone of decreased density consisting of the framework marrow, and also known as "Trümmerfeldzone"; (3) atrophic changes in the cortex with thinning of the cortex and disappearance of the trabeculæ, producing a smooth transparent aspect like ground glass; (4) a circular dense edge about the centers of epiphyseal ossification which corresponds to the process present in the zone of temporary calcification; (5) evidences in well-advanced cases of subperiosteal hemorrhages.

The author classifies his series of cases into four stages. The first three stages identify the case as to its severity, while the fourth stage is that of healing.

The differentiation must be made from rickets, osteomyelitis, sarcoma, and congenital syphilis. The author discusses the differential diagnosis in detail.

Walter H. Ude, M.D.

BOOK REVIEWS

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BOOKS RECEIVED FOR REVIEW

SPINAL ANESTHESIA. Charles H. Evans, M.D., Clinical Assistant, New York Post Graduate Medical School and Hospital. 203 pages. Illus. Cloth, $5.50. New York: Paul B. Hoeber, 1929.

ANGINA PECTORIS. Harlow Brooks, M.D., New York. 164 pages. Price, $2.50. New York: Harper & Brothers, 1929.

DEVILS, DRUGS AND DOCTORS. Howard W. Haggard, M.D., Associate Professor of Applied Physiology, Yale University. Author of *The Science of Health and Disease.* 405 pages. Illus. New York and London: Harper & Brothers, 1929.

SERUM DIAGNOSIS BY COMPLEMENT FIXATION, WITH SPECIAL REFERENCE TO SYPHILIS, THE PRINCIPLES, TECHNIC AND CLINICAL APPLICATIONS. John A. Kolmer, M.S., M.D., Dr.P.M., D.Sc., LL.D., Professor of Pathology and Bacteriology in the Graduate School of Medicine of the University of Pennsylvania and Member of the Research Institute of Cutaneous Medicine. 583 pages. Illustrated, with 65 engravings. $7.00. Philadelphia: Lea & Febiger, 1928.

This work is the summary of the author's clinical and laboratory investigations during the past nine years in serum diagnosis by complement fixation in the field of bacterial, protozoal and metazoal diseases of man and the lower animals. The identification of blood and seminal stains and the detection of meat and milk adulterations has been prepared for use by serologists, laboratorians, practising physicians and veterinarians.

In Part I, 104 pages are devoted to an exposition of the fundamental principles of the reaction; in Part II and III, 345 pages are well filled with complete, exact, and detailed descriptions of the author's methods of technic, and the remainder of the book presents the clinical application of this test. The illustrations are well chosen, and the bibliography is complete and up to date.

A. W. DAHLSTROM, M.D.

ACUTE INFECTIOUS DISEASES. Schamberg and Kolmer. 888 pages. Illus. Cloth, $10.00. Philadelphia: Lea & Febiger, 1928.

The second edition of this work, considerably revised and enlarged, promises to make it the same standard authority on infectious diseases that Osler occupies in medicine. Written by a leading dermatologist, and a renowned pathologist, it speaks with definiteness and conviction.

The chapters on vaccination and smallpox are splendid monographs, and contain complete information on every phase of these subjects. The tables and illustrations are particularly illuminating.

The authors accept as final the hemolytic streptococcus as the cause of scarlet fever. They state that the contagiousness of scarlet fever is limited at the outset (as contrasted with measles), but that the disease may be transmitted even two or three months later, in some cases. The Dick test is admitted to have but limited value. Active immunization receives favorable commendation, but should consist of at least five injections of the toxin, culminating in a dose of 60,000 skin test doses. A final opinion on Larson's detoxified toxin-vaccine is withheld. The use of scarlet fever antitoxin as a prophylactic is of value, but has lost favor due to the serum reactions. Human convalescent serum is suggested for temporary immunization. The use of anti-scarlet-fever serum in the treatment of scarlet fever receives enthusiastic approval, but may, however, interfere with complete immunity being established against a subsequent infection.

Passive immunization against measles by the injection of convalescent serum or adult whole blood is strongly urged for children under two years of age, or those for whom measles might be a serious complication of existing pathology.

Prophylactic injections of antitoxin for persons exposed to diphtheria is recommended, despite the argument against this procedure, because of the resulting protein sensitization. The Schick test is considered unnecessary in children under five years of age, as these are practically always positive. To make certain that immunity has been established by toxin-antitoxin, the Schick test should be conducted three to six months after immunization. The authors recommend the use of toxoid instead of toxin-antitoxin with less warmth than this change actually warrants. For treatments of diphtheria they recommend 5,000 units for mild cases, and 10,000 to 20,000 units for more severe types. Children should be given as much, or more, than adults.

The authors recommend the early administration of freshly prepared vaccine for prophylaxis and treatment of pertussis.

The serum treatment in erysipelas is advised in almost all cases.

To anyone who desires a complete exposition of these subjects, this text should prove invaluable. The type, paper and illustrations should satisfy the most exacting.

THOMAS MYERS, M.D.

UROLOGY. Edward L. Keyes, Professor of Urology, Cornell University. 750 pages. Price $10.00. New York: D. Appleton & Co., 1928.

It is refreshing to open a textbook which at once presents the subjects that are of practical interest to the medical man. Several chapters are given to examination—both general and instrumental. Due consideration is given to all parts of the genito-urinary system as regards anatomy, physiology and pathology, but it is not

superfluous or overdone; hence, the entire subject of Urology can be presented in one volume. Diagnosis, especially differential, is well presented. Treatment both medical and surgical is presented in a simple manner easily grasped and understood. The plates and illustrations are good.

The style of the text is delightful. In reading the book one at once feels the presence of the teacher, the instructor and friend, and the reader enjoys the benefit of a lifetime experience of the author as well.

The text does not taste of selfishness or arrogance; rather, due credit is humbly given those other writers who may be skilled in Urology.

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Richardson, W. J.....Fairmont
Sommer, A. W.....Elmore
Sybilrud, S. W.....Bricelyn
Wilson, C. E.....Blue Earth

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Chippewa, Lac Qui Parle, Sibley, Renville, and Yellow Medicine Counties.
Regular meetings, quarterly.
Annual meeting, subject to call of President.

President
Passer, A. A.....Olivia

Secretary
Holmberg, L. J.....Canby

Adams, R. C.....Bird Island
Aldrich, F. H.....Belview
Bacon, R. S.....Montevideo
Bergh, L. N.....Montevideo
Brand, W. A.....Redwood Falls
Burns, M. A.....Milan
Cole, H. B.....Redwood Falls
Cress, E. E.....Boyd
Dordal, J.....Sacred Heart
Duncan, Henry.....Marietta
Engelhart, P. C.....Minneapolis
Ericksen, L. G.....Wood Lake
Fawcett, A. M.....Granite Falls
Flinn, B. P.....Redwood Falls
Flinn, T. E.....Redwood Falls
Flower, W. Z.....Minneapolis
Foshager, Henry T.....Clara City
Gaines, E. C.....Buffalo Lake
Hassett, Roger G.....Mankato
Hauge, M. M.....Clarkfield
Holmberg, L. J.....Canby
Johnson, C. M.....Dawson
Johnson, H. M.....Dawson
Kaufman, A. J.....Franklin
Kertesz, G.....Arlington
Kilbride, J. S.....Canby
Lee, Walter N.....Madison
Lima, Ludvig.....Montevideo
Mee, P. H.....Osseo
Mesker, G. H.....Olivia
Mitchell, A. B.....Hector
Nelson, M. S.....Granite Falls
Olson, W. P.....Gaylord
Orlob, W. M.....Renville
Passer, A. A.....Olivia
Paul, L. W.....Canby
Penhall, F. W.....Morton
Smith, L. G.....Montevideo
Stemsrud, A. A.....Dawson
Tangen, Geo. M.....Canby
Traxler, Felix J.....Henderson
Westby, Magnus.....Madison
Westby, Nels.....Madison

CENTRAL MINNESOTA DISTRICT MEDICAL SOCIETY

Anoka, Isanti, Kanabec, Mille Lacs and Sherburne Counties.
Regular meetings, May, August, November.
Annual meeting, November.

President
Swenson, Charles.....Braham

Secretary
Cooney, H. C.....Princeton

Caley, G. R.....Princeton
Cooney, H. C.....Princeton
Hall, E. L.....Princeton
Holm, C. E.....Isle
Kooiker, Herman J.....Milaca
Peterson, A. A.....Mora
Roadman, I. M.....Ponsford
Roehlke, A. B.....Elk River
Swennes, O. S.....Wahkon
Swenson, Charles.....Braham
Vik, Melvin.....Onamia
Vrooman, F. E.....St. Francis

CHISAGO-PINE COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, May

President
Zeien, Thos.....North Branch

Secretary
Kelsey, C. G.....Hinckley

Bohling, B. S.....Sandstone
Callahan, F. F.....Pokegama
Dredge, H. P.....Sandstone
Flom, A. O.....Chisago City
Freymiller, E. F.....Markville
Holmes, A. E.....Rush City
Hultkrans, R. E.....Rush City
Kelsey, C. G.....Hinckley
Pearson, William T.....Finlayson
Stephan, E. L.....Hinckley
Stewart, R. I.....Lindstrom
Stratte, A. K.....Pine City
Stratte, Harold C.....Pine City
Zeien, Thos.....North Branch

CLAY-BECKER COUNTY MEDICAL SOCIETY

Regular meetings, January, April, July and October.
Annual meeting, October.

President
Scott, R. A.....Detroit Lakes

Secretary
Heimark, J. H.....Moorhead

Aborn, W. H.....Hawley
Archibald, F. M.....Mahnomen
Bergheim, M. C.....Hawley
Bottolfson, B. T.....Moorhead
Carmen, J. E.....Detroit Lakes
Ellingson, A. R.....Detroit Lakes
Gosslee, G. L.....Moorhead
Gunderson, R. M.....Lake Park
Hagen, Olaf J.....Moorhead
Heimark, J. H.....Moorhead
Humphrey, E. W.....Moorhead
Larsen, O. O.....Detroit Lakes
Meighen, J. W.....Ulen
Rutledge, L. H.....Detroit Lakes
Scott, R. A.....Detroit Lakes
Simison, C. W.....Hawley
Thornby, H. J.....Moorhead
Thysell, F. A.....Moorhead

DODGE COUNTY MEDICAL SOCIETY

Regular meetings, January, May and September.
Annual meeting, September.

Vice President
Smith, F. D.....Kasson

Secretary
Bigelow, C. E.....Dodge Center

Adams, R. T.....Mantorville
Baker, Harry R.....Hayfield
Bigelow, C. E.....Dodge Center
Clifford, F. F.....West Concord
Smith, F. D.....Kasson

FREEBORN COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, December.

Vice President
Calhoun, F. W.....Albert Lea

Secretary
Freligh, W. P.....Albert Lea

Branham, D. S.....Albert Lea
Burns, H. D.....Albert Lea
Butturff, C. R.....Freeborn
Calhoun, F. W.....Albert Lea
Folken, F. G.....Albert Lea
Freeman, J. P.....Albert Lea
Freligh, W. P.....Albert Lea
Gamble, J. W.....Albert Lea
Gamble, P. M.....Albert Lea
Gamble, R. M.....Albert Lea
Gullixson, A.....Albert Lea
Kaasa, L. J.....Albert Lea
Kamp, B. A.....Albert Lea
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Schultz, J. A.....Albert Lea
Von Berg, J. P.....Albert Lea

GOODHUE COUNTY MEDICAL SOCIETY

Annual meeting, February.

President
Steffens, L. A.....Red Wing

Secretary
Anderson, S. H.....Red Wing

Aanes, A. M.....Red Wing
Anderson, S. H.....Red Wing
Bjorgo, C. W.....Cannon Falls
Claydon, Donald R.....Red Wing
Claydon, L. E.....Red Wing
Conley, Alvah A.....Cannon Falls
Cremer, M. H.....Red Wing
Fortney, G. O.....Zumbrota
Johnson, A. E.....Red Wing
Jones, A. W.....Red Wing
McGuigan, H. T.....Red Wing
Sawyer, H. P.....Goodhue
Smith, M. W.....Red Wing
Steffens, L. A.....Red Wing

HENNEPIN COUNTY MEDICAL SOCIETY

Regular meetings, first Monday of each month except June, July, August and September.
Annual meeting, first Monday in January.

President
Pearce, N. O.....Minneapolis

Secretary
Hansen, Erling W.....Minneapolis

Adair, Fred L.....Minneapolis
Allen, H. W.....Minneapolis
Allison, R. G.....Minneapolis
Almquist, H. E.....Minneapolis
Altnow, Hugo O.....Minneapolis
Anderson, A. E.....Minneapolis
Anderson, Arnold S.....St. Paul
Anderson, Arnt.....Minneapolis
Anderson, David D.....Minneapolis
Anderson, Edward D.....Minneapolis
Anderson, Ernest R.....Minneapolis
Anderson, Silas C.....Minneapolis
Andrews, R. S.....Minneapolis
Annis, H. B.....Minneapolis
Arey, H. C.....Excelsior
Armstrong, Harry G.....Minneapolis
Arvidson, C. G.....Minneapolis
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Avery, J. Fowler.....Minneapolis
Baken, Melvin P.....Minneapolis
Baker, Alfred T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, Looe.....Minneapolis
Bakke, O. H.....Minneapolis
Barber, J. P.....Minneapolis
Barron, Moses.....Minneapolis
Barton, E. R.....Minneapolis
Bass, G. W.....Minneapolis
Baxter, S. H.....Minneapolis
Beard, Archie.....Minneapolis
Beard, R. O.....Minneapolis
Bedford, E. W.....Minneapolis
Bell, E. T.....Minneapolis
Bell, J. W.....Minneapolis
Benedict, E. E.....Minneapolis
Benjamin, A. E.....Minneapolis
Benn, F. G.....Minneapolis
Berglund, Hilding.....Minneapolis
Bessesen, A. N., Sr.....Minneapolis
Bessesen, Al. N., Jr.....Minneapolis
Bessesen, Dan H.....Minneapolis
Bessesen, Wm. A.....Minneapolis
Bissell, F. S.....Minneapolis
Blake, James.....Hopkins
Blaustone, H. H.....Minneapolis
Bockman, M. W. H.....Minneapolis
Boies, Lawrence R.....Minneapolis
Booth, A. E.....Minneapolis
Boquist, E. T. W.....Minneapolis
Boquist, Harold S.....Minneapolis
Borgeson, Egbert J.....Minneapolis
Bouman, H. A. H.....Minneapolis
Boynton, Ruth E.....Minneapolis
Bracken, H. M.....Minneapolis
Bratrud, Arthur F.....Minneapolis
Brown, Edgar D.....Minneapolis
Brown, Edward J.....Minneapolis
Bulkley, Kenneth.....Minneapolis
Butler, John.....Minneapolis
Buzzelle, L. K.....Minneapolis
Byrnes, W. J.....Minneapolis
Cabot, George S.....Minneapolis
Cabot, V. S.....Minneapolis
Cady, L. H.....Minneapolis
Callerstrom, G. W.....Minneapolis
Camp, W. E.....Minneapolis
Campbell, L. M.....Minneapolis
Campbell, R. A.....Minneapolis
Cardle, Archibald E.....Minneapolis
Carey, James B.....Minneapolis
Carlaw, C. M.....Minneapolis
Caron, Robert P.....Minneapolis
Cavanor, F. T.....Minneapolis
Chamberlain, H. E.....Minneapolis
Cheleen, S. J.....Minneapolis
Cherry, Chas. H.....Minneapolis
Chesley, A. J.....Minneapolis
Cirkler, A. A.....Minneapolis
Clark, Howard S.....Minneapolis
Condit, W. H.....Minneapolis
Cook, H. W.....Minneapolis
Cooperman, Harold.....Minneapolis
Corniea, A. D.....Minneapolis
Corbett, J. Frank.....Minneapolis
Cosman, E. O.....Minneapolis
Crafts, L. M.....Minneapolis
Cranmer, Richard R.....Minneapolis
Creighton, Ralph H.....Minneapolis
Crune, George P.....Minneapolis
Curtin, John F.....Minneapolis
Cutts, George.....Minneapolis
Dady, Elmer E.....Minneapolis
Dahl, Elmer O.....Minneapolis
Dahl, John A.....Minneapolis
Dahlstrom, A. W.....Minneapolis
Daniel, Donald H.....Minneapolis
Daniel, Lewis M.....Minneapolis
Dart, Leslie O.....Minneapolis
Devereaux, T. G.....Wayzata
Dewar, J. E.....Minneapolis
Deziel, G.....Minneapolis
Diehl, Harold S.....Minneapolis
Diessner, H. D.....Minneapolis
Disen, C. F.....Minneapolis
Donaldson, C. A.....Chandler, Ariz.
Dorge, Richard I.....Minneapolis
Dornblaser, H. B.....Minneapolis
Doxey, G. L.....Minneapolis
Drake, Chas. R.....Minneapolis
Dreisbach, Norman.....Minneapolis
Duff, Edwin R.....Minneapolis
Dunlap, E. H.....Minneapolis
Dutton, C. E.....Minneapolis
Dunn, George R.....Minneapolis
Dunsmoor, F. A.....Minneapolis
Dworsky, Samuel.....Minneapolis
Egilsrud, Kristian.....Minneapolis
Ehrenberg, C. J.....Minneapolis
Eich, Matthew.....Minneapolis
Eitel, George D.....Minneapolis
Ellison, David E.....Minneapolis
Erb, Fred A.....Minneapolis
Erdmann, C. A.....Minneapolis
Ericson, John G.....Minneapolis
Evans, Edward T.....Minneapolis

Everlof, J. L. Minneapolis
Fansler, W. A. Minneapolis
Farabaugh, Chas. L. Minneapolis
Farr, R. E. Minneapolis
Feeney, John M. Minneapolis
Fenger, E. Oak Terrace
Fink, Walter H. Minneapolis
Fischer, G. Minneapolis
Fjelstad, C. Alford Minneapolis
Fleming, A. S. Minneapolis
Flocken, Chas. F. Pasadena, Cal.
Fowler, L. H. Minneapolis
Fredericks, George M. Minneapolis
Friedell, A. Minneapolis
Funk, Victor K. Oak Terrace
Gammel, J. H. Minneapolis
Garand, J. H. Dayton
Gardner, Edwin L. Minneapolis
Geist, Emil S. Minneapolis
Giere, E. O. Minneapolis
Giere, J. C. Minneapolis
Giere, Richard W. Minneapolis
Giessler, Paul W. Minneapolis
Gingold, Benjamin A. Minneapolis
Goldberg, Isadore M. Minneapolis
Gordon, George J. Minneapolis
Gosin, D. F. Minneapolis
Grave, Floyd Minneapolis
Green, E. K. Minneapolis
Greene, Willard P. Minneapolis
Greisheimer, Esther M. Minneapolis
Gunderson, Nels A. Minneapolis
Hacking, Frank Minneapolis
Haddow, N. W. Minneapolis
Hagen, C. L. Minneapolis
Haggard, George D. Minneapolis
Hall, J. M. Minneapolis
Hall, S. S. Minneapolis
Hallberg, C. A. Minneapolis
Hamel, Arnold L. Minneapolis
Hamilton, A. S. Minneapolis
Hamlin, George B. Minneapolis
Hammond, A. J. Minneapolis
Hannah, Hewitt B. Minneapolis
Hansen, Erling Minneapolis
Hansen, Olga S. Minneapolis
Hanson, Harlow J. Minneapolis
Hanson, H. V. Minneapolis
Hanson, William A. Minneapolis
Hare, Earle R. Minneapolis
Harrington, C. D. Minneapolis
Harrington, F. E. Minneapolis
Hart, William E. Minneapolis
Hartzell, Thomas B. Minneapolis
Hastings, D. R. Minneapolis
Hathaway, J. C. Minneapolis
Haverfield, Addie R. Minneapolis
Hayes, J. M. Minneapolis
Head, G. D. Minneapolis
Hearn, Wm. O. Minneapolis
Hedback, A. E. Minneapolis
Helk, H. H. Minneapolis
Hendrickson, J. F. Minneapolis
Henry, C. E. Minneapolis
Henry, Myron O. Minneapolis
Herbolsheimer, A. J. Minneapolis
Herbst, Wm. P. Minneapolis
Herman, Arthur L. Minneapolis
Hiebert, J. P. Minneapolis
Higbee, Paul A. Minneapolis
Higgins, J. H. Minneapolis
Hill, Eleanor J. Minneapolis
Hirschfelder, A. D. Minneapolis
Hirschfield, F. R. Minneapolis
Hoaglund, Arthur W. Minneapolis
Hobbs, C. A. Minneapolis
Hodge, S. V. Minneapolis
Hoiland, A. S. Minneapolis
Holen, T. Minneapolis
Holl, P. M. Minneapolis
Holm, George A. Minneapolis
Holt, William B. Minneapolis
Huenekens, E. J. Minneapolis
Hughes, L. D. Minneapolis
Hutchinson, Chas. J. Minneapolis
Hymes, Charles Minneapolis
Hynes, James Minneapolis
Hynes, John E. Minneapolis
Irvine, H. G. Minneapolis
Irwin, Alex F. Minneapolis
Jackson, C. M. Minneapolis
Jennings, Frank L. Oak Terrace
Jennings, Mary H. Minneapolis
Jensen, Harry Minneapolis
Jensen, M. J. Minneapolis
Johnson, A. E. Minneapolis
Johnson, A. Elof Minneapolis
Johnson, James A. Minneapolis
Johnson, Julius Minneapolis
Johnson, Nimrod A. Minneapolis
Johnson, Norman Minneapolis
Johnson, R. A. Minneapolis
Johnson, Selmer M. Minneapolis
Jones, G. M. Minneapolis
Jones, H. W. Minneapolis
Jones, W. A. Minneapolis
Jones, William R. Minneapolis
Josewich, Alexander Minneapolis
Kennedy, C. C. Minneapolis
Kennedy, Jane F. Minneapolis
Kennedy, R. Roy Minneapolis
Kernkamp, Leila Minneapolis
Kibbe, O. A. Minneapolis
King, E. A. Minneapolis
King, Harry T. Minneapolis
King, W. R. Minneapolis
Kinsella, Thos. J. Oak Terrace
Kistler, A. J. Minneapolis
Kistler, C. M. Minneapolis
Knight, Ralph T. Minneapolis
Knight, Ray R. Minneapolis
Koch, John Charles Minneapolis
Koller, H. M. Minneapolis
Koller, L. R. Minneapolis
Kremer, Walter J. Minneapolis
Kriedt, Daniel Minneapolis
Kucera, Frank Jos. Hopkins
Kucera, Wm. J. Minneapolis
Kusske, A. L. New Ulm
Lajoie, J. M. Minneapolis
Lapierre, Arthur P. Minneapolis
Lapierre, C. A. Minneapolis
Lapierre, J. T. Minneapolis
Larson, Clarence M. Minneapolis
Laurent, A. A. Minneapolis
LaVake, R. T. Minneapolie
Lazar, H. L. Minneapolis
Leavitt, H. H. Minneapolis
Lebowski, Jos. A. Minneapolis
Lee, H. M. Minneapolis
Leland, Harold R. Minneapolis
Leland, M. N. Minneapolis
Lemstrom, Jarl Minneapolis
Leonard, L. J. Minneapolis
Lind, C. J. Minneapolis
Lindquist, R. H. Minneapolis
Linner, H. P. Minneapolis
Linton, Wm. B. Minneapolis
List, Walter E. Minneapolis
Litchfield, John T. Minneapolis
Litzenberg, J. C. Minneapolis
Logefeil, Rudolph C. Minneapolis
Long, Jesse Minneapolis
Loomis, E. A. Minneapolis
Lundgren, A. C. Minneapolis
Lundquist, E. F. Minneapolis
Lynch, M. J. Minneapolis
Lyng, John A. Minneapolis
Lyon, E. P. Minneapolis
Lysne, Henry Minneapolis
MacDonald, A. E. Minneapolis
MacDonald, D. A. Minneapolis
MacDonald, Irving C. Minneapolis
McCarthy, Donald Minneapolis
McCartney, James S. Minneapolis
McDaniel, Oriana Minneapolis
McEachran, A. Minneapolis
McFarland, A. H. Minneapolis
McGandy, R. F. Minneapolis
McGeary, George E. Minneapolis
McKinlay, C. A. Minneapolis
McKinley, J. C. Minneapolis
McKinney, F. S. Minneapolis
McPheeters, H. O. Minneapolis
Mach, Frank B. Minneapolis
Magiera, Estelle A. Minneapolis
Maland, C. O. Minneapolis
Mann, A. T. Minneapolis
Marcley, W. J. Minneapolis
Mariette, Ernest Oak Terrace
Mark, D. B. Minneapolis
Martinson, C. J. Wayzata
Matchan, Glenn R. Minneapolis
Matthews, Justus Minneapolis
Maxeiner, Stanley R. Minneapolis
May, W. H. Minneapolis
Mead, Marion A. Minneapolis
Merkert, Charles E. Minneapolis
Merkert, George L. Minneapolis
Meyer, E. L. Minneapolis
Michael, J. C. Minneapolis
Michelson, H. E. Minneapolis
Moir, Wm. W. Minneapolis
Monahan, R. H. Minneapolis
Moorhead, Martha B. Minneapolis
Moren, Edwin Minneapolis
Moriarity, Cecile R. Minneapolis
Morrison, A. W. Minneapolis
Murphy, Ignatius J. Minneapolis
Murphy, Leo Minneapolis
Myers, J. A. Minneapolis
Nathanson, M. H. Minneapolis
Nelson, C. P. Minneapolis
Nelson, H. S. Minneapolis
Nelson, O. E. Minneapolis
Newhart, Horace Minneapolis
Noran, A. N. Minneapolis
Nordin, G. T. Minneapolis
Nordland, Martin Minneapolis
Noth, H. W. Minneapolis
Oberg, C. M. Minneapolis
O'Donnell, J. E. Minneapolis
Olson, F. A. Minneapolis
Olson, G. M. Minneapolis
Olson, Olaf A. Minneapolis
Olson, R. G. Minneapolis
Owre, Oscar Minneapolis
Parks, A. H. Minneapolis
Patterson, W. E. Minneapolis
Paulsen, E. L. Minneapolis
Pearce, Naboth Osborne Minneapolis
Pederson, Harold Minneapolis
Pederson, R. M. Minneapolis
Peppard, T. A. Minneapolis
Perry, Ralph St. J. Minneapolis
Peterson, Oliver H. Minneapolis
Petersen, J. R. Minneapolis
Petersen, Thorvald Minneapolis
Peterson, Willard C. Minneapolis
Petit, L. J. Minneapolis
Petter, Chas K. Oak Terrace
Pettit, C. W. Minneapolis
Phelps, Kenneth A. Minneapolis
Platou, Erling S. Minneapolis
Pollard, D. W. Minneapolis
Polzak, Jacob Minneapolis
Poppe, F. H. Minneapolis
Porter, Oliver M. Minneapolis
Pratt, Fred J. Minneapolis
Pratt, J. A. Minneapolis
Preine, I. A. Minneapolis
Prim, J. A. Minneapolis
Proshek, Chas. E. Minneapolis
Quinby, Thomas F. Minneapolis
Quist, H. W. Minneapolis
Reed, Chas. A. Minneapolis
Rees, S. P. Minneapolis
Regnier, E. A. Minneapolis
Reynolds, J. S. Minneapolis
Rice, Carl O. Minneapolis
Richardson, Fred S. Minneapolis
Richdorf, L. F. Minneapolis
Ridgway, Florence M. Minneapolis
Rigler, Leo G. Minneapolis
Rishmiller, J. H. Minneapolis
Rizer, R. I. Minneapolis
Roan, Carl M. Minneapolis
Robb, Edwin F. Minneapolis
Roberts, Thos. S. Minneapolis
Roberts, W. B. Minneapolis
Robitshek, E. C. Minneapolis
Rochford, W. E. Minneapolis
Rodda, F. C. Minneapolis
Rodgers, Chas. L. Minneapolis
Rosen, S. Minneapolis
Rosenberg, George C. Minneapolis
Rosenberg, Maurice N. Minneapolis
Rosenwald, R. M. Minneapolis
Rowe, Paul H. Minneapolis
Rucker, Wm. H. Minneapolis
Rudell, Gustav L. Minneapolis
Rumpf, Wm. H., Jr. Minneapolis
Sadler, William P. Minneapolis
Sawatzky, Wm. A. Minneapolis
Schaaf, F. H. Minneapolis
Schaefer, Wesley G. Minneapolis
Scheldrup, N. H. Minneapolis
Schlutz, Frederic W. Minneapolis
Schmitt, Aaron F. Minneapolis
Schmitt, S. C. Minneapolis
Schussler, Otto F. Minneapolis
Schwartz, Vergil J. Minneapolis
Schwyzer, Gustav Minneapolis
Schwyzer, Robert Minneapolis
Scott, F. H. Minneapolis
Seashore, Gilbert Minneapolis
Seham, Max Minneapolis
Selleseth, Iver F. Minneapolis
Shapiro, Morse J. Minneapolis
Simons, Jalmar Minneapolis
Simpson, E. D. Minneapolis
Simpson, John D. Minneapolis
Siperstein, D. M. Minneapolis
Sivertsen, Andrew Minneapolis
Sivertsen, Ivar Minneapolis
Slocumb, Maude S. Minneapolis
Smith, A. M. Minneapolis
Smith, Arthur E. Minneapolis
Smith, Homer R. Minneapolis
Smith, Norman S. Minneapolis
Soderlind, A. Minneapolis
Solhaug, S. B. Minneapolis
Spratt, C. N. Minneapolis
Stelter, Lloyd A. Minneapolis
Stewart, C. A. Minneapolis
Stomel, J. Minneapolis
Strachauer, A. C. Minneapolis
Strout, Eugene S. Minneapolis
Strout, G. Elmer Minneapolis

Sturre, J. R.....Minneapolis
Sundt, Mathias.....Minneapolis
Swanson, Roy E.....Minneapolis
Sweetser, H. B., Sr.....Minneapolis
Sweetser, H. B., Jr.....Minneapolis
Sweetser, Theodore.....Minneapolis
Sweitzer, S. E.....Minneapolis
Swendseen, Carl G.....Minneapolis
Taft, John O.....Minneapolis
Tanner, Alvin C.....Minneapolis
Taylor, Joseph H.....Minneapolis
Taylor, Rood.....Minneapolis
Ternstrom, O. H.....Minneapolis
Thomas, George E.....Minneapolis
Thomas, George H.....Minneapolis
Thomas, Gilbert.....Minneapolis
Thompson, H. H.....Minneapolis
Tingdale, A. C.....Minneapolis
Tunstead, Hugh J.....Minneapolis
Turnacliff, D. D.....Minneapolis
Tyrell, C. C.....Minneapolis
Ude, Walter H.....Minneapolis
Ulrich, Henry L.....Minneapolis
Undine, Clyde A.....Minneapolis
Urner, John A.....Minneapolis
Voyer, E. O.....Minneapolis
Wahlquist, Harold F.....Minneapolis
Waldron, Carl W.....Minneapolis
Wanous, E. Z.....Minneapolis
Ward, A. W.....Minneapolis
Ward, Percy.....Minneapolis
Warham, T. T.....Minneapolis
Watson, J. A.....Minneapolis
Webb, R. C.....Minneapolis
Weisman, S. A.....Minneapolis
Welles, H. J.....Minneapolis
Wethall, A. G.....Minneapolis
Wetherby, Macnider.....Minneapolis
Weum, T. W.....Minneapolis
White, S. Marx.....Minneapolis
White, Willard D.....Minneapolis
Whetstone, Mary S.....Minneapolis
Widen, W. F.....Minneapolis
Wiese, H. F. B.....Minneapolis
Wilcox, Archa E.....Minneapolis
Wilder, Robert L.....Minneapolis
Wilken, Paul A.....Minneapolis
Willcutt, Clarence.....Minneapolis
Williams, H. L.....Minneapolis
Williams, Robert.....Minneapolis
Witham, C. A.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wood, Douglas F.....Minneapolis
Woodworth, Elizabeth.....Minneapolis
Wright, C. B.....Minneapolis
Wright, C. D'a.....Minneapolis
Wright, Franklin R.....Minneapolis
Wynne, H. M. N.....Minneapolis
Ylvisaker, R. S.....Minneapolis
Yoerg, Otto W.....Minneapolis
Zaworski, Ed. A.....Minneapolis
Zierold, A. A.....Minneapolis

HOUSTON-FILLMORE COUNTY MEDICAL SOCIETY

Regular meetings, not stated.
Annual meeting, October.

President
Williams, R. V.....Rushford

Secretary
Helland, J. W.....Spring Grove

Anderson, Norman E.....Harmony
Baldwin, A. E.....Houston
Belote, G. B.....Caledonia
Browning, W. E.....Caledonia
Christianson, H. W.....Wykoff
Davis, I. G.....Rushford
Drake, F. A.....Lanesboro
Eby, C. B.....Spring Valley
Grinnell, W. B.....Preston
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Lannin, J. C.....Mabel
Lommen, A. P.....Lanesboro
Nass, H. A.....Mabel
Onsgard, C. K.....Halstad
Onsgard, L. K.....Houston
Palmer, R. N.....Lanesboro
Tierney, C. M.....Harmony
Williams, R. V.....Rushford
Woodruff, C. W.....Chatfield

KANDIYOHI-SWIFT COUNTY MEDICAL SOCIETY

Regular meeting, at call of President.
Annual meeting, December.

President
Dowswell, W. J.....Kerkhoven

Secretary
Scofield, C. L.....Benson

Anderson, R. E.....Willmar
Behmler, Fred W.....Appleton
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Daignault, Oscar.....Benson
Dowswell, W. J.....Kerkhoven
Frederickson, Alice.....Lake Lillian
Frederickson, Guy U. Y.....Lake Lillian
French, H. S.....Duluth
Fiksdal, M. J.....Willmar
Frost, E. H.....Willmar
Giere, S. W.....Benson
Hodapp, R. J.....Willmar
Jacobs, John C.....Willmar
Johnson, Hans.....Kerkhoven
Kaufman, Wm. C.....Appleton
Rains, J. M.....Willmar
Scofield, C. L.....Benson
Thompson, Arthur.....Raymond

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, monthly.
Annual meeting, first Tuesday in October.

President
Akester, Ward.....Marshall

Secretary
Workman, H. M.....Tracy

Akester, Ward.....Marshall
Bossingham, O. N.....Lake Benton
Bursheim, P. J.....Lake Benton
Ford, Burton C.....Marshall
Germo, Chas.....Balaton
Gray, F. D.....Marshall
Hermanson, Peter E.....Ivanhoe
Hoidale, A. D.....Tracy
Jacquot, G. L.....Marshall
Persons, C. E.....Marshall
Robertson, J. B.....Cottonwood
Sanderson, E. T.....Minneota
Thordarson, Theo.....Minneota
Vadheim, A. L.....Tyler
Valentine, W. H.....Tracy
Workman, H. M.....Tracy
Workman, W. G.....Tracy
Yaeger, W. W.....Ivanhoe

McLEOD COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, September.

President
Trutna, Thos. J.....Silver Lake

Secretary
Jensen, A. H.....Hutchinson

Clement, J. B.....Lester Prairie
Crow, E. R.....Arlington
Holm, H. H.....Glencoe
Jensen, A. H.....Hutchinson
Klima, W. W.....Stewart
Langhoff, A. H.....Glencoe
Rempel, Dietrich D.....Brownton
Sahr, W. G.....Hutchinson
Schmidt, W. R.....Glencoe
Scholpp, O. W.....Hutchinson
Sheppard, Fred.....Hutchinson
Sheppard, P. E.....Hutchinson
Trutna, Thos. J.....Silver Lake

MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, May, August and October.
Annual meeting, December.

President
Brigham, Frank.....Watkins

Secretary
Danielson, K. A.....Litchfield

Brigham, Frank.....Watkins
Danielson, K. A.....Litchfield
Dulude, S. S.....Dassel
O'Connor, D. C.....Eden Valley
Peterson, Alfred.....Dassel
Robertson, A. W.....Litchfield
Robertson, W. P.....Litchfield
Wilmot, H. E.....Litchfield

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of each month except July and August.
Annual meeting, last Thursday in November.

President
Robertson, P. A.....Austin

Secretary
Fisch, Herbert M.....Austin

Allen, A. W.....Austin
Allen, Chas. C.....Austin
Coleman, F. B.....Austin
Cronwell, B. J.....Austin
Fisch, Herbert M.....Austin
Grise, W. B.....Austin
Havens, J. G. W.....Austin
Hegge, O. H.....Austin
Henslin, A. E.....LeRoy
Hertel, G. E.....Austin
Leck, Clifford C.....Austin
Lewis, Charles F.....Austin
Lommen, P. A.....Austin
McKenna, J. K.....Austin
Melzer, G. R.....Lyle
Mitchell, R. S.....Grand Meadow
Morrow, James J.....Austin
Morse, M. P.....LeRoy
Robertson, P. A.....Austin
Sheedy, Chester L.....Austin
Torkelson, P. T.....Lyle

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Regular meetings, June, September and December.
Annual meeting, December.

President
Peterson, Magnus C.....St. Peter

Secretary
Daniels, J. W.....St. Peter

Aitkens, H. B.....Le Sueur Center
Covell, W. W.....St. Peter
Daniels, J. W.....St. Peter
Dodge, F. A.....Le Sueur
Ericson, Swan.....Le Suer
Goforth, Clifford.....St. Peter
Freeman, George H.....St. Peter
Holtan, Theodore.....Waterville
Kirschbaumer, Louisa.....St. Peter
LeClerc, J. E.....Le Sueur
Lenander, Melvin E.....St. Peter
McKechnie, Wilfred.....St. Peter
McKeon, J. O.....Montgomery
Meilicke, W. A.....Nicollet
Peterson, Magnus C.....St. Peter
Strathern, Fred P.....St. Peter

OLMSTED COUNTY MEDICAL SOCIETY

Regular meetings, second Wednesday in April, June, September and December.
Annual Meeting, November 21.

President
Dolder, F. C.....Eyota

Secretary
Piper, M. C.....Rochester

Abbott, Walter Dayton.....Rochester
Adams, S. Franklin.....Rochester
Adson, A. W.....Rochester
Allan, Frank Nathaniel.....Rochester
Allen, Edgar Vanice.....Rochester
Allen, Roy William.....Rochester
Allen, W. A.....Rochester
Alvarez, Walter C.....Rochester
Amberg, Samuel.....Rochester
Anderson, C. M.....Rochester
Anderson, E. W.....Rochester
Anderson, Mark J.....Rochester
Anderson, Reuben Mauritz.....Rochester
Anderson, Richard Speight.....Rochester
Bain, Charles Grant.....Rochester
Balfour, D. C.....Rochester
Bannick, Edwin George.....Rochester
Barborka, C. J.....Rochester
Bargen, J. Arnold.....Rochester
Barker, Nelson Waite.....Rochester
Barnes, A. R.....Rochester
Bayard, Harry Frederick.....Rochester
Beaver, Meredith Grable.....Rochester
Benedict, W. L.....Rochester
Berkman, D. M.....Rochester
Berkman, John Mayo.....Rochester
Binger, Melvin W.....Rochester
Birkeland, Ivar W.....Rochester
Bliss, Theodore Liston.....Rochester
Bodine, Marc Williams.....Rochester
Boeck, William Charles.....Rochester
Bonesteel, Henry T. S.....Rochester
Bonta, M. B.....Rochester
Boothby, W. M.....Rochester
Bowing, H. H.....Rochester
Bowles, John H.....Rochester
Braasch, William F.....Rochester
Bratrude, E. J.....Rochester
Broders, A. C.....Rochester
Brown, A. E.....Rochester
Brown, C. B.....Rochester
Brown, G. E.....Rochester
Brown, P. W.....Rochester
Bruner, Julian M.....Rochester
Brunsting, Louis A.....Rochester
Buie, L. A.....Rochester
Bumpus, H. C.....Rochester
Bumpus, Laurin Dudley.....Rochester
Bunten, William A.....Rochester
Busby, James Leslie.....Rochester
Camp, John Dexter.....Rochester
Carmichael, Hugh Thompson.....Rochester
Cave, Harry Allan.....Rochester
Caylor, Harold D.....Rochester
Christensen, Eli E.....Rochester
Chumley, Charles L.....Rochester
Clawson, Thomas Alfred, Jr.....Rochester
Coakley, Leo P.....Rochester
Coleman, Julian Harwood.....Rochester
Comfort, Mandred Whitset.....Rochester
Conner, H. M.....Rochester
Cooke, Harry Hamilton.....Rochester
Corbeille, Catharine.....Rochester
Counsellor, Virgil S.....Rochester
Craig, Winchell McK.....Rochester
Crenshaw, J. L.....Rochester
Crewe, J. E.....Rochester
Daniels, Harry A.....Rochester
Davis, Austin Clifford.....Rochester
Davis, John Dwight.....Rochester
Dawley, Walter Averill.....Rochester
Dean, Benjamin F.....Rochester
DeCarle, Donald W.....Rochester
Decker, Walter Joseph.....Rochester
Desjardins, Arthur U.....Rochester
Ditmore, David C.....Rochester
Dixon, Claude F.....Rochester
Dixon, Robert Kenneth.....Rochester
Dolder, F. C.....Eyota
Down, Howard Ivan.....Rochester
Doyle, J. B.....Rochester
Drips, D. G.....Rochester
Dunlap, H. F.....Rochester
Eubanks, G. F., Jr.....Rochester
Eusterman, G. B.....Rochester
Evarts, Arrah B.....Rochester
Fallon, John Michael.....Rochester
Faust, Louis Sanders.....Rochester
Fauster, John Ulrich, Jr.....Rochester
Fawcett, C. E.....Stewartville
Fehland, Harold Roland.....Rochester
Figi, F. A.....Rochester
Finney, W. P., Jr.....Rochester
Ford, Frances A.....Rochester
Fortin, Harry J.....Rochester
Foster, Wilmot C.....Rochester
Fowler, Louis McCargo.....Rochester
Fox, Ben.....Rochester
Frederickson, Clyde Harold.....Rochester
Fricke, Robert Elmer.....Rochester
Fulcher, Oscar Hugh.....Rochester
Gaarde, F. W.....Rochester
Giffin, H. Z.....Rochester
Gleason, Notery Arthur.....Rochester
Goeckerman, W. H.....Rochester
Good, Louis P.....Rochester
Good, Ralph W.....Rochester
Gorder, Arne Christian.....Rochester
Graham, A. Stephens.....Rochester
Greene, Carl Hartley.....Rochester
Greenlee, Daniel P.....Rochester
Grier, James P.....Rochester
Habein, Harold C.....Rochester
Haines, S. F.....Rochester
Haldeman, Keene Oliver.....Rochester
Hallenbeck, D. F.....Rochester
Hamrick, Robert A.....Rochester
Hand, John R.....Rochester
Hane, Richard Lincoln.....Rochester
Hanlon, Frank Robert.....Rochester
Harrington, S. W.....Rochester
Hartman, Howard R.....Rochester
Hartwell, Shattuck W.....Rochester
Hartzell, John B.....Rochester
Havens, Fred Z.....Rochester
Heck, Frank Joseph.....Rochester
Hefke, Hans W.....Rochester
Heimdahl, Clarence O.....Rochester
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hench, Philip S.....Rochester
Henderson, M. S.....Rochester
Herrman, S. F.....Rochester
Heyerdale, O. C.....Rochester
Hill, Frederick Charles.....Rochester
Holland, Wilbur Wallace.....Rochester
Horton, Bayard Taylor.....Rochester
Huffman, Lester D.....Los Angeles, Cal.
Humiston, Homer W.....Rochester
Hunt, Henry Franklin.....Rochester
Hunt, V. C.....Rochester
Hurt, Algernon Smith, Jr.....Rochester
Jacobs, Minerd F.....Rochester
Johnson, Walter Royle.....Rochester
Jones, H. T.....Rochester
Jones, Robert DuVae.....Rochester
Jordan, Ferdinand Michael.....Rochester
Joyce, George Leo.....Stewartville
Joyce, G. T.....Rochester
Judd, E. S.....Rochester
Keith, N. M.....Rochester
Kennedy, Roger L. J.....Rochester
Kepler, Edwin J.....Rochester
Kernohan, James Watson.....Rochester
Kilbourne, A. F.....Rochester
Lacy, Nicholas Eugene.....Rochester
Larson, Lawrence M.....Rochester
Leddy, Eugene T.....Rochester
Lemon, W. S.....Rochester
Lillie, H. I.....Rochester
Lillie, W. I.....Rochester
Logan, A. H.....Rochester
Loughery, Harold B.....Rochester
Luden, Georgine.....Rochester
Lundy, John S.....Rochester
Magath, T. B.....Rochester
Magee, Henry Ross.....Rochester
Mahorner, Howard Raymond.....Rochester
Malmgren, George F.....Rochester
Margolis, Harry Maurice.....Rochester
Marshall, James M.....Rochester
Masson, D. M.....Rochester
Masson, J. C.....Rochester
Mattson, Hamline.....Rochester
May, James Alan.....Rochester
Mayo, C. H.....Rochester
Mayo, Charles W.....Rochestre
Mayo, Joseph Graham.....Rochester
Mayo, W. J.....Rochester
Maytum, Charles K.....Rochester
McBride, William Percy.....Rochester
McCann, James C.....Rochester
McCarty, Ray Bardwell.....Rochester

McCuskey, Charles F.....Rochester
McKaig, Carle B.....Pine Island
McQuiggan, Mark Ronald....Rochester
McVicar, Chas. S.....Rochester
Metheny, David.....Rochester
Meyerding, H. W.....Rochester
Miller, Charles D.....Rochester
Mills, Ralph Garfield.....Rochester
Moench, L. Mary.....Rochester
Moersch, F. P.....Rochester
Moersch, H. J.....Rochester
Mohart, John Henry.....Rochester
Montgomery, Hamilton.....Rochester
Moore, A. B.....Rochester
Moore, Thomas B.....Rochester
Morton, Herschel B.....Rochester
Mroz, Rudolph John.....Rochester
Mulholland, Stanford W.....Rochester
Murphy, George Thomas.....Rochester
Murray, James Kenneth P.....Rochester
Mussey, R. D.....Rochester
Nelson, Wallace LeRoy.....Rochester
Nesbit, Mark Edwin.....Rochester
New, G. B.....Rochester
Nickel, Allen A. C.....Rochester
Norment, William B.....Rochester
Norton, Manville W.....Rochester
Nunn, Leslie Laughlin.....Rochester
Nutting, Roland Edward.....Rochester
Ochsner, Harold C.....Rochester
Offutt, Susan R.....Rochester
Ohlinger, L. B.....Chicago
O'Leary, P. A.....Rochester
Olson, Ernest A.....Pine Island
Palmer, B. M.....Rochester
Parker, H. L.....Rochester
Parson, George W.....Rochester
Partch, Wallace Taylor.....Rochester
Passalacqua, Luis A.....Rochester
Pemberton, J. deJ.....Rochester
Perry, Clarence L.....Rochester
Peterson, Joel Asbury.....Rochester
Pfeffer, Theodore John.....Rochester
Piper, M. C.....Rochester
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Pollock, L. W.....Rochester
Pope, Charles E.....Rochester
Prangen, A. D.....Rochester
Prescott, Manfred U.....Rochester
Prickman, Louis Elwood.....Rochester
Priestly, Joseph Biddle.....Rochester
Prout, Curtis T.....Rochester
Puestow, Charles Bernard.....Rochester
Quale, Victor Sigvold.....Rochester
Radtke, H. P.....Rochester
Randall, Lawrence Merrill.....Rochester
Rankin, F. W.....Rochester
Rathman, Omer C.....Rochester
Rentschler, Edwin B.....Rochester
Reuter, Maurice Jerome.....Rochester
Rienets, John H.....Rochester
Rivers, A. B.....Rochester
Robertson, H. E.....Rochester
Rogers, James C. T.....Rochester
Rosenow, E. C.....Rochester
Rowntree, L. G.....Rochester
Rubenstein, Myer W.....Rochester
Rucker, Charles Wilbur.....Rochester
Ruedemann, Ehckardt.....Rochester
Sanford, A. H.....Rochester
Schacht, Frederick William.....Rochester
Shafter, Royce R.....Rochester
Sheldon, W. D.....Rochester
Sistrunk, W. E.....Rochester
Smith, F. L.....Rochester
Smith, Harry L.....Rochester
Smith, Leonard Marshall.....Rochester
Smith, Newton D.....Rochester
Smith, William M.....Rochester
Snell, Albert M.....Rochester
Spannuth, John Roy.....Rochester
Spooner, Christopher Martin...Rochester
Squire, Fay H.....Rochester
Stacy, L. J.....Rochester
Stark, W. B.....Rochester
Steven, Geo.....Byron
Steward, John Alexander.....Rochester
Stuhler, Louis G.....Rochester
Sutherland, C. G.....Rochester
Sussex, Lloyd Thomas.....Rochester
Sutton, L. F.....Mazeppa
Thomas, Lester C.....Rochester
Thompson, Fred Rush.....Rochester
Thompson, Gersham J.....Rochester
Thompson, H. L.....Rochester
Tinkess, Donald Ewing.....Rochester
Vaaler, T.....Rochester
Vanzant, Frances Ralston.....Rochester
Vickery, Eugene B.....Rochester
Viecelli, James Dominic.....Rochester
Vinson, P. P.....Rochester
Von Lackum, W. H.....Rochester
Wagener, H. P.....Rochester
Walters, Waltman.....Rochester
Watkins, C. H.....Rochester
Weber, H. M.....Rochester
Weir, J. F.....Rochester
Wellbrock, William L. A.....Rochester
Wheeler, Theodora.....Rochester
White, Robert Boothe.....Rochester
Whitten, Merritt B.....Rochester
Wickham, Mont Cecil.....Rochester
Wilder, Russell M.....Rochester
Wilhelmj, Charles Martell.....Rochester
Williams, Henry Lane, Jr.....Rochester
Willius, F. A.....Rochester
Wilson, L. B.....Rochester
Woltman, H. W.....Rochester
Wood, H. G.....Rochester
Wright, William C.....Rochester
Yesko, Stephan Aloysius.....Rochester
Ziegler, Lloyd Hiram.....Rochester

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Otter Tail, Wilkin, Grant, and Douglas Counties.
Regular meetings, second Wednesday in January, April, July and October.
Annual meeting, second Wednesday in October.

President
Haskell, A. D.....Alexandria

Secretary
Satersmoen, Theo.....Pelican Rapids

Baker, A. C.....Fergus Falls
Blakey, A. R.....Osakis
Boyeson, Peter.....Pelican Rapids
Brabec, F. J.....Perham
Brabec, P. F.....Perham
Broker, W. S.....Battle Lake
Burnap, W. L.....Fergus Falls
Cowing, P. G.....Evansville
Drought, W. W.....Fergus Falls
Esser, John.....Perham
Estrem, C. O.....Fergus Falls
Freeborn, J. A.....Fergus Falls
Hand, W. R.....Elbow Lake
Haskell, A. D.....Alexandria
Heiberg, E. A.....Fergus Falls
Houkom, Bjarne.....Fergus Falls
Kierland, P. E.....Alexandria
Kemp, M. W.....Fergus Falls
Kittleson, T. N.....Fergus Falls
Lee, W. A.....Fergus Falls
Leibold, H. H.....Parkers Prairie
Lewis, A. J.....Henning
Love, Fred A.....Carlos
Meckstroth, C. W.....Brandon
Meland, Ernest L.....Dalton
Naegeli, Frank.....Fergus Falls
Nelson, O. N.....Battle Lake
Nelson, Wallace I.....Underwood
Otto, H. C.....Frazee
Parson, L. R.....Elbow Lake
Patterson, W. L.....Fergus Falls
Paulson, T. S.....Fergus Falls
Satersmoen, Theo.....Pelican Rapids
Sather, E. R.....Alexandria
Sherping, O. Th.....Fergus Falls
Tanquist, E. J.....Alexandria
Vail, James B.....Henning
Wray, W. E.....Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of month except June, July and August.
Annual meeting, last Monday of January.

President
Cole, Wallace.....St. Paul

Secretary
Schulze, Albert G.....St. Paul

Abbott, J. S.....St. Paul
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Alberts, Max W.....St. Paul
Alden, J. F.....St. Paul
Aldes, Harry.....St. Paul
Alexander, F. H.....St. Paul
Allen, Mason.....St. Paul
Arends, A. L.....St. Paul
Armstrong, J. M.....St. Paul
Arnquist, A. S.....St. Paul
Arouni, Khalil.....St. Paul
Arzt, C. P.....St. Paul
Aurelius, J. Richards.....St. Paul
Bacon, Donald K.....St. Paul
Bacon, Knox.....St. Paul
Bacon, L. C.....St. Paul
Balcome, F. E.....St. Paul
Ball, C. R.....St. Paul
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Beadie, W. D.....Cannon Falls
Beals, Hugh.....St. Paul
Bell, C. C.....St. Paul
Benepe, L. M.....St. Paul
Bennion, P. H.....St. Paul
Bentley, Norman P.....St. Paul
Berrisford, Paul D.....St. Paul
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bock, R. A.....St. Paul
Boeckmann, Egil.....St. Paul
Bohland, E. H.....St. Paul
Bole, R. S.....St. Paul
Borg, Joseph F.....St. Paul
Bouma, L. R.....St. Paul
Brand, G. D.....St. Paul
Bray, E. R.....St. Paul
Brimhall, J. B.....St. Paul
Brodie, Walter D.....St. Paul
Brooks, D. F.....St. Paul
Brooks, G. F.....St. Paul
Brown, Edw. I.....St. Paul
Brown, John C.....St. Paul
Brown, S. E.....St. Paul
Burch, F. E.....St. Paul
Burfiend, G. H.....St. Paul
Burns, F. W.....St. Paul
Burns, R. M.....St. Paul
Burton, Carl.....St. Paul
Buscher, H.....St. Paul
Caldwell, Jas. P.....St. Paul
Caldwell, Kenneth S.....St. Paul
Cameron, J. A.....St. Paul
Campbell, J. E.....South St. Paul
Cannon, Harry.....St. Paul
Carman, C. I.....St. Paul
Carman, Paul I.....St. Paul
Carroll, W. C.....St. Paul
Carter, Fred G.....St. Paul
Chatterton, C. C.....St. Paul
Christiansen, A.....St. Paul
Christison, J. T.....St. Paul
Clark, T. C.....Minneapolis
Colby, Woodward.....St. Paul
Cobb, S. G.....St. Paul
Cole, Wallace H.....St. Paul
Collie, H. G.....St. Paul
Colvin, A. R.....St. Paul
Comstock, A. E.....St. Paul
Conner, William H.....Minneapolis
Connor, C. E.....St. Paul
Cook, Paul B.....St. Paul
Countryman, Roger S.....St. Paul

Cowern, E. W. North St. Paul
Critchfield, L. R. St. Paul
Crump, J. W. St. Paul
Culligan, J. M. St. Paul
Culligan, Leo Courtney St. Paul
Dack, L. G. St. Paul
Darling, J. B. St. Paul
Daugherty, E. B. St. Paul
Daugherty, L. E. St. Paul
Davis, Herbert St. Paul
Davis, William St. Paul
Dedolph, Karl St. Paul
Derauf, B. I. St. Paul
Dickson, Thos. H., Jr. St. Paul
Dittman, Geo. C. St. Paul
Dohm, A. J. St. Paul
Donohue, Phillip F. St. Paul
Drake, Carl B. St. Paul
Dunn, J. N. St. Paul
Dunne, Gerald P. St. Paul
Earl, George A. St. Paul
Earl, Robert O. St. Paul
Edlund, G. St. Paul
Ely, O. S. South St. Paul
Emerson, E. C. St. Paul
Engberg, E. J. St. Paul
Ernest, G. C. St. Paul
Eshelby, E. C. St. Paul
Fahey, E. W. St. Paul
Ferguson, J. C. St. Paul
Fesler, Harold H. St. Paul
Flagstad, A. E. St. Paul
Fogarty, Charles W. St. Paul
Foley, F. E. B. St. Paul
Freeman, C. D. St. Paul
Fulton, J. F. St. Paul
Gager, E. C. St. Paul
Garbrecht, Arthur St. Paul
Gardiner, D. G. St. Paul
Geer, Everett K. St. Paul
Gehlen, J. N. St. Paul
Geist, George A. St. Paul
Ghent, C. Harry St. Paul
Ghent, M. M. St. Paul
Gilfillan, J. S. St. Paul
Ginsberg, Wm. St. Paul
Goltz, E. V. St. Paul
Grant, H. W. St. Paul
Gratzek, Thomas St. Paul
Greene, Charles L.* St. Paul
Gruenhagen, Arnold P. St. Paul
Hagaman, Geo. K. St. Paul
Hall, A. R. St. Paul
Hall, Henry H. St. Paul
Halper, Philip St. Paul
Hammes, E. M. St. Paul
Hammond, J. F. St. Paul
Harmon, G. E. St. Paul
Hartfiel, Wm. F. St. Paul
Hartley, E. C. St. Paul
Hauser, V. P. St. Paul
Hawkins, V. J. St. Paul
Heath, A. C. St. Paul
Heck, Wm. W. St. Paul
Hedenstrom, Frank G. St. Paul
Hengstler, W. H. St. Paul
Hensel, C. N. St. Paul
Herrmann, Edgar T. St. Paul
Hesselgrave, S. S. St. Paul
Hilger, A. W. St. Paul
Hilger, D. D. St. Paul
Hilger, L. A. St. Paul
Hiniker, Louis P. St. Paul
Hochfilzer, J. J. St. Paul
Hoff, Alfred St. Paul
Hoffman, Max H. St. Paul
Holcomb, J. T. St. Paul
Holcomb, O. W. St. Paul
Holt, John E. St. Paul
Howard, W. S. St. Paul
Hultkrans, Joel C. St. Paul
Hunt, H. E. St. Paul
Ide, A. W. St. Paul
Ikeda, Kano St. Paul
Johnson, Asa M. St. Paul
Johnson, C. E. St. Paul
Johnson, H. C. St. Paul
Johnson, Ray G. St. Paul
Johnson, T. H. St. Paul
Jones, D. C. St. Paul
Jones, E. M. St. Paul
Kadesky, David St. Paul
Komman, Gordon R. St. Paul
Kannary, E. L. St. Paul
Kelly, John V. St. Paul
Kelly, Paul St. Paul
Kennedy, Wm. A. St. Paul
Kenny, H. F. St. Paul
Kesting, Herman St. Paul
King, George L. St. Paul
King, Z. P. St. Paul
Kistler, A. S. St. Paul
Klein, H. N. St. Paul
Knauff, M. K. St. Paul
Kvitrud, G. St. Paul
Langenderfer, F. V. St. Paul
Larsen, C. L. St. Paul
Larson, M. L. St. Paul
Lax, Morris H. St. Paul
Leahy, Bartholomew St. Paul
Leavenworth, Richard O. St. Paul
Leitch, Archibald St. Paul
Leonard, Gilbert John St. Paul
Lepak, John A. St. Paul
Lerche, William St. Paul
Lewis, W. W. St. Paul
Lick, C. Louis St. Paul
Little, W. J. St. Paul
Lowe, Earl R. South St. Paul
Lowe, Thomas A. South St. Paul
Lund, Arthur E. St. Paul
Lundholm, A. M. St. Paul
McBeath, Ewing C. New York City
McCarthy, W. R. St. Paul
McClanahan, J. H. White Bear
McClanahan, T. S. White Bear
McCloud, C. N. St. Paul
McKeon, Owen St. Paul
McLaren, Jennette M. St. Paul
McNevin, C. F. St. Paul
Martineau, J. L. St. Paul
Meyerding, E. A. St. Paul
Mitchell, Frederick St. Paul
Mogilner, S. N. St. Paul
Molander, H. A. St. Paul
Moquin, Marie A. St. Paul
Morrissey, F. B. St. Paul
Mortensen, N. G. St. Paul
Moss, Myer N. St. Paul
Moynihan, T. J. St. Paul
Muller, R. Theo. St. Paul
Myers, Thos. St. Paul
Neher, F. H. St. Paul
Nelson, L. A. St. Paul
Nesbit, Harold T. St. Paul
Nippert, H. T. St. Paul
Nordin, C. G. St. Paul
Norris, Edgar H. St. Paul
Nye, Katherine A. St. Paul
Nye, Lillian I. St. Paul
O'Brien, H. J. St. Paul
O'Connor, I. A. St. Paul
O'Connor, J. P. St. Paul
Oerting, Harry St. Paul
Ogden, Warner St. Paul
Ohage, Justus St. Paul
Ohage, Justus, Jr. St. Paul
Olson, Chas. A. St. Paul
Ostergren, E. W. St. Paul
Pearson, F. R. St. Paul
Pederson, A. H. St. Paul
Penny, L. E. St. Paul
Perry, C. G. St. Paul
Peterson, V. N. St. Paul
Plondke, F. J. St. Paul
Prendergast, H. J. St. Paul
Ramsey, W. R. St. Paul
Richards, E. T. F. St. Paul
Richardson, Harold E. St. Paul
Riggs, C. E. St. Paul
Ritchie, H. P. St. Paul
Rogers, John T. St. Paul
Rosenholtz, Burton St. Paul
Rosenthal, Robert St. Paul
Rothrock, J. L. St. Paul
Roy, Philomen St. Paul
Rothschild, H. J. St. Paul
Ruhberg, George N. St. Paul
Rutherford, W. C. St. Paul
Ryan, John J. St. Paul
Ryan, Mark E. St. Paul
Satterlund, Victor St. Paul
Savage, F. J. St. Paul
Schoch, R. B. St. Paul
Schons, E. St. Paul
Schuldt, F. C. St. Paul
Schulze, Albert G. St. Paul
Schwyzer, Arnold St. Paul
Senkler, G. E. St. Paul
Setzer, H. J. St. Paul
Shannon, W. Ray St. Paul
Shellman, John L. St. Paul
Shillington, M. A. St. Paul
Simon, B. F. St. Paul
Skinner, H. O. St. Paul
Snyder, G. W. St. Paul
Sohlberg, O. I. St. Paul
Souster, B. B. St. Paul
Sprafka, J. M. St. Paul
Sterner, E. G. St. Paul
Sterner, O. W. St. Paul
Stevens, F. A. Lake Elmo
Stewart, Alexander St. Paul
Stierle, Adolph, Jr. St. Paul
Stinnette, S. E. St. Paul
Stolpestad, H. L. St. Paul
Swanson, Edwin O. St. Paul
Swanson, John A. St. Paul
Swendson, J. J. St. Paul
Taylor, H. L. St. Paul
Teisburg, C. B. St. Paul
Tiber, L. J. St. Paul
Tregilgas, H. R. South St. Paul
Van Slyke, Charles A. St. Paul
Vonder Weyer, William St. Paul
Waas, Charles William St. Paul
Walker, R. E. St. Paul
Wallinga, John H. St. Paul
Warnock, R. W. St. Paul
Warren, E. L. St. Paul
Welch, M. C. St. Paul
Werner, O. S. St. Paul
Wheeler, M. W. St. Paul
Whitacre, J. C. St. Paul
Whitcomb, Ed. H. St. Paul
White, J. S. St. Paul
Whitmore, Frank W. St. Paul
Whitney, A. W. St. Paul
Williams, Clayton K. St. Paul
Williamson, Geo. A. St. Paul
Winnick, J. B. St. Paul
Wold, K. C. St. Paul
Wolfe, H. H. St. Paul
Zander, C. H. St. Paul
Zimmermann, H. B. St. Paul

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meetings, at call of president.

Annual meeting, June.

President
Weiser, Geo. B. New Ulm

Secretary
Meierding, Wm. A. New Ulm

Abraham, Arden L. Gibbon
Dubbe, F. H. New Ulm
Eckstein, A. W. Mankato
Fauth, Karl J. Gaylord
Fritsche, Albert New Ulm
Fritsche, L. A. New Ulm

*Deceased

Gibbons, Francis C. Comfrey
Goblirsch, A. P. Sleepy Eye
Hammermeister, Theo. New Ulm
Hovde, Rolf Winthrop
Jamieson, Earl Walnut Grove
Just, H. J. Lafayette
Kiefer, M. A. Sleepy Eye
Kolset, Karl D. Sanborn
Meierding, Wm. A. New Ulm
Pederson, O. J. Hanska
Peterson, R. A. Vesta
Reineke, Geo. F. New Ulm
Rothenburg, J. C. Springfield

Saffert, Cornelius A. New Ulm
Scherer, Roland G. Morgan
Schoch, J. L. New Ulm
Seifert, Otto J. New Ulm
Shrader, J. S. Springfield
Strickler, Mary R. Sleepy Eye
Vogel, Joseph New Ulm
Vogtel, Melvin A. Minneapolis
Weiser, Geo. B. New Ulm
Wellcome, J. W. B. Sleepy Eye
Wohlrabe, Clarence F. Springfield
Wohlrabe, E. J. Springfield
Weissgerber, L. A. New Ulm

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Marshall, Polk, Roseau, Pennington, Red Lake, Norman and Mahnomen Counties.

Regular meetings, April, September, December.

Annual meeting, December.

President
Froehlich, H. W.....Thief River Falls

Secretary
Dean, Arthur C.....Crookston

Adkins, C. M.....Grygla
Anderson, J. K.....Minneapolis
Anderson, W. S.....Minneapolis
Bernard, B. C.....Thief River Falls
Bertelson, O. L.....Crookston
Biedermann, Jacob....Thief River Falls
Blegen, H. M.....Warren
Bowers, J. T.....Thief River Falls
Bratrud, O. Edw.....Warren
Bratrud, Theodor.....Warren
Brosseau, J. E.....Argyle
Brown, Lyle L.....Crookston
Button, A. J.....Greenbush
Dean, Arthur C.....Crookston
Delmore, J. L.....Roseau
Dunlop, Alex H.....Crookston
Edstrom, Henry.....Crookston
Engstrand, Oscar J.....Warren
Erickson, J. L.....Twin Valley
Froelich, H. W.....Thief River Falls
Griffin, P. J.....Fertile
Hansen, M.....Ada
Henney, Wm. H.....McIntosh
Hodgson, H. H.....Crookston
Hollands, W. H.....Fisher
Holmes, W. B.....Ada
Holte, H.....Crookston
Kahala, Arthur.....Crookston
Kirk, G. P.....East Grand Forks
Larson, A. L.....Philadelphia
Leitch, N. M.....Warroad
Locken, O. E.....Crookston
Mellby, O. F.....Thief River Falls
Mercil, Wm. F.....Crookston
Morley, G. A.....Crookston
Nelson, H. E.....Crookston
Norman, J. F.....Crookston
Ohnstad, J. L.....McIntosh
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston
Overend, K. V.....Hallock
Roy, J. A.....Red Lake Falls
Sather, Allen.....Fosston
Shaleen, A. W.....Hallock
Shedlov, A.....Fosston
Shelland, J. T.....Ada
Stratte, J. J.....Hallock
Swedenberg, A. W.....Thief River Falls
Tessier, W. O.....Oklee
Turnbull, Robert.....Fosston
Vistaunet, P. S.....Shelly
Watson, N. M.....Red Lake Falls
Wattam, G. S.....Warren
Wiltrout, I. Geo.....Oslo

RICE COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, December.

President
Wilson, Warren.....Northfield

Secretary
Plonske, C. J.....Faribault

Babcock, F. M.....Northfield
Beede, Ethel R.....Faribault
Backe, Edmund.....Kenyon
Davis, F. U.....Faribault
Dungay, Neil S.....Northfield
Francis, David W.....Morristown
Haessly, S. B.....Faribault
Hanson, A. M.....Faribault
Haskins, John L.....New York
Haynes, A. L.....Faribault
Huxley, F. R.....Faribault
Kanne, C. W.....Faribault
Lexa, F. J.....Lonsdale
McBroom, D. E.....Cambridge
Mayland, M. L.....Faribault
Meyer, P. F.....Faribault
Moses, Joseph, Jr.....Northfield
Murdoch, J. M.....Faribault
Neseth, O. S.....Kenyon
Plonske, C. J.....Faribault
Robilliard, C. M.....Faribault
Robilliard, W. H.....Faribault
Rumpf, C. W.....Faribault
Rumpf, W. H.....Faribault
Smith, P. A.....Faribault
Thorsen, Orin P.....Northfield
Traeger, C. A.....Faribault
Wall, C. R.....Northfield
Warren, F. S.....Faribault
Wilson, Warren.....Northfield
Wilson, W. E.....Northfield

ST. LOUIS COUNTY MEDICAL SOCIETY

St. Louis, Lake, Cook, and Carlton Counties.

Regular meetings, second Thursday each month.

Annual meeting, second Thursday, October.

President
Tuohy, E. L.....Duluth

Secretary
Elias, F. J.....Duluth

Abbott, Wm. P.....Duluth
Adams, B. S.....Hibbing
Alexander, Clifford E.....Duluth
Anderson, Hilding C.....Duluth
Arminen, K. V.....Duluth
Armstrong, E. L.....Duluth
Athens, A. G.....Duluth
Ayres, G. T.....Ely
Bagley, W. R.....Duluth
Bakkila, Henry.....Duluth
Bardon, Richard.....Duluth
Barney, L. A.....Duluth
Benson, Otis O.....Soudan
Berdz, G. L.....Duluth
Bergquist, K. E.....Duluth
Bianco, A. J.....Duluth
Binet, H. E.....Grand Rapids
Birkeland, O. N.....Hibbing
Blacklock, S. S.....Hibbing
Blakely, C. C.....Barnum
Block, Phoebe P.....Virginia
Boman, P. G.....Duluth
Bowen, Robert L.....Hibbing
Boyer, S. H.....Duluth
Braden, A. J.....Duluth
Bradley, E. L.....Marion, Ohio
Braverman, N. J.....Duluth
Bray, C. W.....Biwabik
Bullen, F. W.....Hibbing
Burns, R. L.....Two Harbors
Cantwell, F. W.....International Falls
Carstens, C. F.....Hibbing
Chapman, T. L.....Duluth
Cheney, E. L.....Duluth
Christensen, E. P.....Two Harbors
Clement, T. G.....Duluth
Collins, A. N.....Duluth
Collins, H. C.....Duluth
Cosgrove, J. H.....Duluth
Coventry, W. A.....Duluth
Davis, B. F.....Duluth
Davis, H. S.....Duluth
Doolittle, L. E.....Duluth
Drenning, F. C.....Duluth
Eckman, P. F.....Duluth
Eisenman, W. G.....Chisholm
Ekblad, J. W.....Duluth
Eklund, W. J.....Duluth
Elias, F. J.....Duluth
Eppard, R. M.....Cloquet
Estrem, T. A.....Hibbing
Ewens, H. B.....Virginia
Ferreira, G. J.....Duluth
Fischer, Mario McC.....Duluth
Fleming, J.....Cloquet
Forbes, Robert S.....Duluth
Froats, C. W.....Eveleth
Gillespie, M. G.....Duluth
Gillespie, N. H.....Duluth
Gowan, L. R.....Duluth
Graham, David.....Duluth
Graham, R. D.....Duluth
Graham, Robert.....Duluth
Graves, W. N.....Duluth
Grawn, F. A.....Duluth
Greeley, L. Q.....Duluth
Ground, H. T.....Virginia
Haney, C. L.....Duluth
Harris, C. N.....Chisholm
Hathaway, S. J.....Proctor
Hatch, W. E.....Duluth
Hayes, M. F.....Nashwauk
Heimark, O. E.....Duluth
Hill, F. E.....Duluth
Hirschfield, M. S.....Duluth
Hirschboeck, F. J.....Duluth
Hovde, H.....Duluth
Huseby, H. W.....Cloquet
Jacobson, Clarence.....Chisholm
Jensen, T. J.....Duluth
Kean, N. D.....Coleraine
Kerlan, M.....Bemidji
Keyes, C. R.....Duluth
Kiesling, I. H.....Nashwauk
King, W. S.....Eveleth
Klein, Harry.....Duluth
Kliman, F. E.....Duluth
Knapp, F. N.....Duluth
Kohlbry, C. O.....Duluth
Kraft, P.....Duluth
Kuth, J. R.....Duluth
Laird, A. T.....Nopeming
Lenont, C. B.....Virginia
Lepak, F. J.....Duluth
Litman, Samuel N.....Duluth
Loofbourrow, E. H.....Keewatin
Lum, C. E.....Duluth
McCarty, P. D.....Ely
McComb, C. F.....Duluth
McCoy, Mary.....Duluth
McDaniel, S. P.....Mountain Iron
McDonald, A. L.....Duluth
McGiffert, E. N.....Duluth
McHaffie, O. L.....Duluth
McIntyre, E. H.....Virginia
McNutt, John R.....Barnum
MckRuby, Fred.....Hibbing
Macfarlane, P. H.....Chisholm
MacRae, Gordon C.....Duluth
Magie, W. H.....Duluth
Magney, F. H.....Duluth
Manley, J. R.....Duluth
Martin, Edw. T.....Duluth
Martin, W. C.....Duluth
Matill, P. M.....Oak Terrace
Mayne, R. M.....Duluth
Merriman, L. L.....Duluth
Moe, Thos.....Moose Lake
Moe, Russel J.....Duluth
Monroe, P. B.....Two Harbors
More, C. W.....Eveleth
Morsman, L. W.....Hibbing
Morss, C. R.....Zumbrota
Murray, D. D.....Duluth
Nelson, E. H.....Chisholm
Nelson, R. L.....Duluth
Nicholson, M. A.....Duluth
Oredson, O. A.....Duluth

Olson, A. E.....Duluth
Pake, S. G.....Duluth
Parker, O. W.....Ely
Payette, C. H.....Duluth
Pennie, D. F.....Duluth
Power, J. E.....Duluth
Radquist, C. S.....Hibbing
Raihala, John.....Virginia
Raiter, Franklin W. S.....Cloquet
Raiter, Roy F.....Cloquet
Rapp, E. W.....Duluth
Robinson, J. M.....Duluth
Rood, D. C.....Duluth
Rowe, O. W.....Duluth
Rudie, P. S.....Duluth
Ryan, W. J.....Duluth
St. Clair, G. G.....Duluth
Scherer, C. A.....Duluth
Schroder, C. H.....Duluth
Seashore, D. E.....Duluth
Shapiro, E. Z.....Duluth
Shaw, A. W.....Buhl
Sisler, C. E.....Grand Rapids
Slyfield, F. F.....Duluth
Smith, C. M.....Duluth
Smith, E. K.....Duluth
Spicer, F. W.....Duluth
Strathern, M. L.....Gilbert
Strobel, W. G.....Duluth
Stuart, A. B.....Cloquet
Sukeforth, L. A.....Duluth
Sutherland, H. N.....Ely
Swenson, A. O.....Duluth
Taylor, C. W.....Duluth
Tibbetts, M. H.....Duluth
Tilderquist, D. L.....Duluth
Tuohy, E. L.....Duluth
Urberg, S. E.....Duluth
Vercellini, C. E.....Duluth
Vivian, R. S.....Hibbing
Walker, A. E.....Duluth
Webber, Edw. E.....Duluth
Weber, M. L.....Duluth
Webster, H. E.....Duluth
Weirick, Howard R.....Hibbing
Wheeler, D. W.....Duluth
Wilkinson, Stella.....Duluth
Winter, J. A.....Duluth
Young, T. O.....Duluth
Young, V. A.....Duluth
Zlatovski, M.....Duluth

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, every two months in Winter—Every month in Summer.
Annual meeting, in June.

President
Fischer, H. P.....Shakopee

Secretary
Simons, B. H.....Chaska

Bohland, F. J.....Belle Plaine
Buck, F. H.....Shakopee
Cervenka, Charles F.....New Prague
Eklund, E. J.....Norwood
Fischer, H. P.....Shakopee
Fischer, P. M.....Shakopee
Henriksen, H. G.....Elko
Hebeisen, M. B.....Carver
Juergens, H. M.....Belle Plaine
Kolars, J. J.....Le Sueur Center
McKeon, James.....St. Paul
Maertz, W. F.....New Prague
Nagel, H. D.....Waconia
Novak, E. E.....New Prague
Olson, Chester J.....Belle Plaine
Phillips, W. H.....Jordan
Reiter, H. W.....Shakopee
Schneider, H. A.....Jordan
Simons, Bernard H.....Chaska
Westerman, A. E.....Montgomery
Westerman, F. C.....Montgomery

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Pipestone, Rock, Murray, Nobles, Cottonwood and Jackson Counties.
Regular meetings, May and October.
Annual meeting, October.

President
Hitchings, W. S.....Lakefield

Secretary
McKeown, E. G.....Pipestone

Arnold, E. W.....Adrian
Benjamin, M. B.....Jasper
Benjamin, W. G.....Pipestone
Bofenkamp, F. W.....Luverne
Bong, J. H.....Jasper
Brown, A. H.....Pipestone
Chadbourne, A. G.....Heron Lake
Cress, P. J.....Ellsworth
DeBoer, Hermanus.....Edgerton
Ditmeier, L. M. Gerber.....Jasper
Dolan, C. P.....Worthington
Doms, H. C.....Slayton
Dudley, J. H.....Windom
Golden, C. M.....Tyler
Halloran, Walter.....Jackson
Hilger, J. M.....Iona
Hitchings, W. S.....Lakefield
Johnson, Ellsworth.....Windom
Kelling, Louis F.....Lakefield
Kendahl, A. M.....Jasper
Kilbride, E. A.....Worthington
Leebens, J. H.....Lismore
Lowe, Thos.....Pipestone
McCrea, James.....Fulda
McKeown, E. G.....Pipestone
Manson, F. M.....Worthington
Mork, B. O.....Worthington
Nusbaum, D. H.....Jackson
Patterson, W. E.....Westbrook
Piper, Wm. A.....Mountain Lake
Richardson, W. E.....Pipestone
Rose, J. T.....Lakefield
Roust, H. A.....Montevideo
Sherman, C. L.....Luverne
Smallwood, J. T.....Worthington
Slater, S. A.....Worthington
Sogge, L.....Windom
Stanley, C. R.....Worthington
Taylor, Wm. J.....Pipestone
Thorsen, E. O.....Luverne
Tiedemann, Elmer J.....Adrian
Tofte, Josephine.....Dawson
Waller, Joseph D.....Wilmont
Watson, F. G.....Worthington
Wright, C. O.....Luverne
Williams, A. B.....St. Paul
Williams, Leon A.....Slayton

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday, January, April, July and October.
Annual meeting, April.

President
Mahowald, A.....Albany

Secretary
McDowell, J. P.....St. Cloud

Boehm, J. C.....St. Cloud
Brigham, C. F.....St. Cloud
Clark, H. B.....St. Cloud
Du Bois, J. A.....Sauk Center
Du Bois, J. F.....Sauk Center
Fleming, T. N.....St. Cloud
Freeman, W. L.....St. Cloud
Friesleben, Wm.....Sauk Rapids
Gelz, J. J.....St. Cloud
Goehrs, H. W.....St. Cloud
Haberman, E.....Osakis
Halenbeck, Philip L.....St. Cloud
Hemstead, Werner.....St. Cloud
Johnson, Walfred.....Sauk Center
Jones, Richard N.....St. Cloud
Kern, M. J.....St. Cloud
Kingsbury, E. M.....Clearwater
Kohler, D. W.....St. Joseph
Koop, Herman E.....Cold Springs
Koop, S. H.....Richmond
Kuhlman, August.....Melrose
Lewis, C. B.....St. Cloud
Libert, J. N.....St. Cloud
McDowell, J. P.....St. Cloud
McKibben, H. E.....St. Cloud
Mahowald, A.....Albany
Meyer, A. A.....Melrose
Moynihan, A. F.....Sauk Center
Myre, C. R.....Paynesville
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Richards, W. B.....St. Cloud
Ridgway, Alexander.....Belgrade
Schatz, F. J.....St. Cloud
Sutton, Chas.....St. Cloud
Sherwood, G. E.....Kimball
Townsend, DeWayne.....Brooten
Zachman, A. H.....Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, odd months, second Tuesday.
Annual meeting, November.

Vice President
Nelson, Ernest J.....Owatonna

Secretary
Hart, Alfred B., Jr.....Owatonna

Ertel, E. O.....Ellendale
Gault, C. C.....Owatonna
Hart, Alfred B., Jr.....Owatonna
McIntyre, John A.....Owatonna
Melby, Benedik.....Blooming Prairie
Nelson, Ernest J.....Owatonna
Quigley, T. C.....Owatonna
Senn, E. W.....Owatonna
Smersh, J. F.....Owatonna
Stewart, A. B.....Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Crow Wing, Morrison, Cass, Todd, Wadena, Clearwater, Koochiching, Hubbard, Itasca, and Beltrami Counties.
Regular meetings, January, Fall, Summer.
Annual meeting, Jan. 31, 1929.

President
Davis, T. L.—Wadena

Secretary
Badeaux, G. I.—Brainerd

Agnew, Allen T.—International Falls
Allen, F. A.—Crosby
Allen, F. H.—Staples
Anderson, C. E.—Brainerd
Amundson, A. E.—Little Falls
Badeaux, G. I.—Brainerd
Beise, R. A.—Brainerd
Christie, G. R.—Long Prairie
Christie, R. L.—Long Prairie
Corrigan, J. E.—Spooner
Corse, C. A.—Verndale
Craig, C. C.—International Falls
Davis, Thayer C.—Wadena
Davis, L. Thomas—Wadena
Forrest, C. G.—Clearbrook
Frost, Harry T.—Wadena
Gaalaas, A. F.—Wadena
Gerber, Milo P.—Brainerd
Grogan, J. S.—Wadena
Groschup, Theo. P.—Bemidji
Grose, Fredk. N.—Clarissa
Hawkinson, L. F.—Brainerd
Hawkinson, J. P.—Crosby
Healy, R. T.—Pierz
Hilton, J. M.—Browerville
Holst, C. F.—Little Falls
Holst, J. B.—Little Falls
House, Z. E.—Cass Lake
Jacobson, David J.—Blackduck
Johnson, E. W.—Bemidji
Johnson, O. V.—Sebeka
Kenyon, Paul—Wadena
Kerlan, S. Z.—Aitkin
Laney, R. L.—Puposky
Lodmell, Elmer—Wadena
Marcum, E. H.—Bemidji
McHugh, R. F.—Aitkin
Larson, L. M.—St. Paul
Laughlin, J. T.—Grey Eagle
McKinnon, J. J.—Wadena
Miller, W. A.—New York Mills
Moyer, Ralph E.—Bemidji
Nelson Nesmith—Brainerd
Ortman, John W.—Pierz
Osborn, Burt F.—International Falls
Parrott, B. W.—Long Prairie
Pierce, Chas. H.—Wadena
Roberts, L. M.—Little Falls
Shannon, S. S.—Crosby
Simons, Edwin J.—Swanville
Smith, B. A.—Crosby
Stewart, N. W.—Brainerd
Strader, E. L.—Deerwood
Thabes, J. A., Sr.—Brainerd
Thabes, J. A., Jr.—Brainerd
Van Valkenberg, B. F.—Long Prairie
Van Valkenberg, F. W.—Long Prairie
Watson, A. M.—Royalton
Will, W. W.—Bertha
Williams, R. J.—Pine River
Wilcox, F. L.—Walker

WABASHA COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday after first Monday in July.

President
Dempsey, D. P.—Kellogg

Secretary
Wilson, W. F.—Lake City

Bayley, E. C.—Lake City
Bowers, H. E.—Lake City
Cochrane, W. J.—Lake City
Collins, J. S.—Wabasha
Dempsey, D. P.—Kellogg
Fleischhauer, D. S.—Wabasha
Frost, Russell H.—Wabasha
Muir, E. C.—Minneiska
Radabaugh, R. C.—Hastings
Replogle, W. H.—Wabasha
Slocumb, J. A.—Plainview
Stryker, W. B.—Plainview
Wilson, W. F.—Lake City

WASECA COUNTY MEDICAL SOCIETY

Annual meeting, December.

President
McIntire, H. M.—Waseca

Secretary
Swenson, O. J.—Waseca

Bernstein, Wm. C.—New Richland
Blanchard, H. G.—Fairmont
Gallagher, B. J.—Waseca
Hagen, H. O.—New Richland
Leopard, B. A.—Bywood, Pa.
McIntire, H. M.—Waseca
Miller, H. A.—Fairmont
O'Hara, J. J.—Janesville
Saliterman, B. I.—Janesville
Swartwood, F. A.—Waseca
Swenson, O. J.—Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of month.
Annual meeting, second Tuesday in January.

President
Sherman, C. H.—Bayport

Secretary
Sherwood, K. K.—Stillwater

Boleyn, E. S.—Stillwater
Combacker, L. C.—Fergus Falls
Culver, Lucian G.—Stillwater
Haines, J. H.—Stillwater
Humphrey, W. R.—Stillwater
Josewski, R. J.—Stillwater
Kalinoff, D.—Stillwater
Mingo, F. E.—Hugo
Poirier, J. A.—Forest Lake
Sherman, Carnot H.—Bayport
Sherwood, K. K.—Stillwater
Stuhr, J. W.—Stillwater
Thompson, V. C.—Marine

WATONWAN COUNTY MEDICAL SOCIETY

Regular meetings, on call.
Annual meeting, December.

President
Thompson, Albert—St. James

Secretary
Grimes, H. B.—Madelia

Bergman, O. B.—St. James
Bregel, Fred L.—St. James
Grimes, H. B.—Madelia
Hagen, O. E.—Butterfield
Haynes, B. H.—St. James
McCarthy, W. J.—Madelia
Thompson, Albert—St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Traverse, Pope and Stevens Counties.
Regular meetings, every three months.
Annual meeting, October.

President
Gibbon, L. L.—Lowry

Secretary
Linde, Herman—Cyrus

Bates, B. V.—Browns Valley
Bergan, Otto—Clinton
Bolsta, Chas.—Ortonville
Caine, C. E.—Morris
Christenson, C. R.—Starbuck
Eberlin, E. A.—Glenwood
Elsey, J. R.—Glenwood
Ewing, C. F.—Wheaton
Gibbon, L. L.—Lowry
Giesen, A. F.—Starbuck
Judge, Walter T.—Graceville
Karn, B. R.—Ortonville
Leland, John T.—Herman
Leuty, Amos—Morris
Lindberg, A. L.—Wheaton
Linde, Herman—Cyrus
O'Donnell, D. M.—Ortonville
Oliver, C. I.—Graceville
Pierson, Claude M.—Wheaton
Shelver, H. J.—Ortonville
Weir, J. D.—Beardsley

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, January, April, July and October.
Annual meeting, January.

President
Pritchard, D. B.....Winona

Secretary
Steiner, I. W.....Winona

Benoit, F. T.....Winona
Clay, F. H.....St. Charles
Heise, W. F. C.....Winona
Keyes, E. D.....Winona
Lichtenstein, H.....Winona
Lindsay, W. V.....Winona
McDonnell, C. H.....Winona
McLaughlin, E. M.....Winona
Mattison, P. A.....Winona
Meinert, A. E.....Winona
Nauth, W. W.....Winona
Neumann, C. A.....Lewiston
Page, R. L.....St. Charles
Pritchard, D. B.....Winona
Risser, E. D.....Winona
Robbins, C. P.....Winona
Satterlee, H. W.....Lewiston
Schaefer, S.....Winona
Schnarrenberger, G.....Winona
Steiner, I. W.....Winona
Tweedy, G. J.....Winona
Walker, G. H.....Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, October, first Tuesday after first Monday.

President
Klaveness, E.....Monticello

Secretary
Catlin, John J.....Buffalo

Catlin, John J.....Buffalo
Ellison, Frank E.....Monticello
Freed, O. J. R.....Cokato
Harriman, L.....Howard Lake
Klaveness, E.....Monticello
Lee, J. L.....Watertown
Moffatt, A. G.....Howard Lake
Norris, G. H.....Annandale
Northey, T. M.....Rockford
Peterson, O. L.....Cokato
Phillips, A. E.....Delano
Ridgway, A. M.....Annandale
Roholt, C. L.....Waverly
Rousseau, Victor.....Maple Lake
Swezey, B. F.....Buffalo
Thorsen, Thor.....Oslo, Norway

ALPHABETICAL ROSTER

Aanes, A. M. ..... Red Wing
Abbott, J. S. ..... St. Paul
Abbott, Walter D. ..... Rochester
Abbott, Wm. P. ..... Duluth
Aborn, W. H. ..... Hawley
Abraham, Arden L. ..... Gibbon
Adair, F. L. ..... Minneapolis
Adams, B. S. ..... Hibbing
Adams, R. C. ..... Bird Island
Adams, R. T. ..... Mantorville
Adams, S. Franklin ..... Rochester
Adkins, C. M. ..... Grygla
Adson, A. W. ..... Rochester
Agnew, Allen T. ..... International Falls
Ahrens, A. E. ..... St. Paul
Ahrens, A. H. ..... St. Paul
Aitkens, H. B. ..... LeSueur Center
Akester, Ward ..... Marshall
Alberts, Max W. ..... St. Paul
Alden, J. F. ..... St. Paul
Aldes, Harry ..... St. Paul
Aldrich, F. H. ..... Belview
Alexander, Clifford E. ..... Duluth
Alexander, F. H. ..... St. Paul
Allen, Frank N. ..... Rochester
Allen, A. W. ..... Austin
Allen, Chas C. ..... Austin
Allen, Edgar V. ..... Rochester
Allen, F. A. ..... Crosby
Allen, F. H. ..... Staples
Allen, H. W. ..... Minneapolis
Allen, Mason ..... St. Paul
Allen, Roy W. ..... Rochester
Allen, W. A. ..... Rochester
Allison, R. G. ..... Minneapolis
Almquist, H. E. ..... Minneapolis
Altnow, Hugo O. ..... Minneapolis
Alvarez, Walter C. ..... Rochester
Amberg, Samuel ..... Rochester
Amundson, A. E. ..... Little Falls
Anderson, A. E. ..... Minneapolis
Anderson, Arnt G. ..... Minneapolis
Anderson, Arnold S. ..... St. Paul
Anderson, C. E. ..... Brainerd
Anderson, C. M. ..... Rochester
Anderson, David D. ..... Minneapolis
Anderson, Edward D. ..... Minneapolis
Anderson, Ernest R. ..... Minneapolis
Anderson, E. W. ..... Rochester
Anderson, Hilding C. ..... Duluth
Anderson, J. K. ..... Minneapolis
Anderson, Mark J. ..... Rochester
Anderson, Norman E. ..... Harmony
Anderson, R. E. ..... Willmar
Anderson, Reuben M. ..... Rochester
Anderson, Richard S. ..... Rochester
Anderson, Silas C. ..... Minneapolis
Anderson, S. H. ..... Red Wing
Anderson, W. S. ..... Minneapolis
Andrews, J. W. ..... Mankato
Andrews, R. N. ..... Mankato
Andrews, R. S. ..... Minneapolis
Annis, H. B. ..... Minneapolis
Archibald, Frank M. ..... Mahnomen
Arends, A. L. ..... St. Paul
Arey, H. C. ..... Excelsior
Arminen, K. V. ..... Duluth
Armstrong, E. L. ..... Duluth
Armstrong, Harry G. ..... Minneapolis
Armstrong, J. M. ..... St. Paul
Arnold, E. W. ..... Adrian
Arnquist, A. S. ..... St. Paul
Arouni, Khalil ..... St. Paul
Arvidson, C. G. ..... Minneapolis
Arzt, C. P. ..... St. Paul
Athens, A. G. ..... Duluth
Aune, Martin ..... Minneapolis
Aurand, W. H. ..... Minneapolis
Aurelius, J. Richards ..... St. Paul
Avery, J. Fowler ..... Minneapolis
Ayres, G. T. ..... Ely

Babcock, F. M. ..... Northfield
Backe, Edmund ..... Kenyon
Bacon, Donald K. ..... St. Paul
Bacon, Knox ..... St. Paul
Bacon, L. C. ..... St. Paul
Badeaux, G. I. ..... Brainerd
Bagley, W. R. ..... Duluth
Bailey, H. B. ..... Ceylon
Bain, Charles Grant ..... Rochester
Baken, Melvin P. ..... Minneapolis
Baker, A. C. ..... Fergus Falls
Baker, Alfred T. ..... Minneapolis
Baker, E. L. ..... Minneapolis
Baker, Harry R. ..... Hayfield
Baker, Looe ..... Minneapolis
Bakke, O. H. ..... Minneapolis
Bakkila, Henry ..... Duluth
Balcome, F. E. ..... St. Paul
Baldwin, A. E. ..... Houston
Balfour, D. C. ..... Rochester
Ball, C. R. ..... St. Paul
Bannick, Edwin G. ..... Rochester
Barber, J. P. ..... Minneapolis
Barborka, C. J. ..... Rochester
Bardon, Richard ..... Duluth
Barney, L. A. ..... Duluth
Bargen, J. Arnold ..... Rochester
Barker, Nelson W. ..... Rochester
Barnes, A. R. ..... Rochester
Barr, W. H. ..... Wells
Barron, Moses ..... Minneapolis
Barry, L. W. ..... St. Paul
Barsness, Nellie ..... St. Paul
Barton, E. R. ..... Minneapolis
Bass, G. W. ..... Minneapolis
Bates, B. V. ..... Browns Valley
Baxter, S. H. ..... Minneapolis
Bayley, E. C. ..... Lake City
Bayard, Harry F. ..... Rochester
Beach, W. A. ..... Mankato
Beadie, W. D. ..... Cannon Falls
Beals, Hugh ..... St. Paul
Beard, Archie H. ..... Minneapolis
Beard, R. O. ..... Minneapolis
Beaver, M. G. ..... Rochester
Bedford, E. W. ..... Minneapolis
Behmler, Fred W. ..... Appleton
Beede, Ethel R. ..... Faribault
Beise, R. A. ..... Brainerd
Bell, E. T. ..... Minneapolis
Bell, C. C. ..... St. Paul
Bell, J. W. ..... Minneapolis
Belote, G. B. ..... Caledonia
Benedict, E. E. ..... Minneapolis
Benedict, W. L. ..... Rochester
Benepe, L. M. ..... St. Paul
Benham, E. W. ..... Mankato
Benjamin, A. E. ..... Minneapolis
Benjamin, M. B. ..... Jasper
Benjamin, W. G. ..... Pipestone
Benn, F. G. ..... Minneapolis
Bennion, P. H. ..... St. Paul
Benoit, F. T. ..... Winona
Benson, Otis O. ..... Soudan
Bentley, Norman P. ..... St. Paul
Berdez, G. L. ..... Duluth
Bergan, Otto ..... Clinton
Bergheim, M. C. ..... Hawley
Berglund, Hilding ..... Minneapolis
Bergman, O. B. ..... St. James
Bergh, L. N. ..... Montevideo
Bergquist, K. E. ..... Duluth
Berkman, D. M. ..... Rochester
Berkman, John M. ..... Rochester
Bernard, B. C. ..... Thief River Falls
Bernstein, Wm. C. ..... New Richland
Berrisford, Paul D. ..... St. Paul
Bertelson, O. L. ..... Crookston
Bessesen, A. N. ..... Minneapolis
Bessesen, Al. N., Jr. ..... Minneapolis
Bessesen, Daniel H. ..... Minneapolis
Bessesen, W. A. ..... Minneapolis
Best, F. E. ..... Wells
Bianco, A. J. ..... Duluth
Biedermann, Jacob ..... Thief River Falls
Bigelow, C. E. ..... Dodge Center
Binet, H. E. ..... Grand Rapids
Binger, H. E. ..... St. Paul
Binger, Melvin W. ..... Rochester
Birkeland, Ivar W. ..... Rochester
Birkland, O. N. ..... Hibbing
Birnberg, T. L. ..... St. Paul
Bissell, F. S. ..... Minneapolis
Bjorgo, C. W. ..... Cannon Falls
Black, Wm. ..... Mankato
Blacklock, S. S. ..... Hibbing
Blake, Jas. ..... Hopkins
Blakey, A. R. ..... Osakis
Blakely, C. C. ..... Barnum
Blanchard, H. G. ..... Fairmont
Blaustone, Henry H. ..... Minneapolis
Blegen, H. M. ..... Warren
Bliss, Theodore L. ..... Rochester
Block, Phoebe P. ..... Virginia
Bock, R. A. ..... St. Paul
Bockman, M. W. H. ..... Minneapolis
Bodine, Marc W. ..... Rochester
Boeck, William C. ..... Rochester
Boeckmann, Egil ..... St. Paul
Boehm, J. C. ..... St. Cloud
Bofenkamp, F. W. ..... Luverne
Bohland, E. H. ..... St. Paul
Bohland, F. J. ..... Belle Plaine
Bohling, B. S. ..... Sandstone
Boies, Lawrence R. ..... Minneapolis
Bole, R. S. ..... St. Paul
Boleyn, E. S. ..... Stillwater
Bolsta, Chas. ..... Ortonville
Boman, P. G. ..... Duluth
Bomberger, C. B. ..... Mapleton
Bonesteel, Henry T. S. ..... Rochester
Bong, J. H. ..... Jasper
Bonta, M. B. ..... Rochester
Booth, A. E. ..... Minneapolis
Boothby, W. M. ..... Rochester
Boquist, E. T. W. ..... Minneapolis
Boquist, Harold S. ..... Minneapolis
Borg, Joseph F. ..... St. Paul
Borgeson, Egbert J. ..... Minneapolis
Bossingham, O. N. ..... Lake Benton
Bottolfson, B. T. ..... Moorhead
Bouma, L. R. ..... St. Paul
Bouman, H. A. ..... Minneapolis
Bowen, Robert L. ..... Hibbing
Bowers, H. E. ..... Lake City
Bowers, J. T. ..... Thief River Falls
Bowing, H. H. ..... Rochester
Bowles, John H. ..... Rochester
Boyer, S. H. ..... Duluth
Boynton, Ruth ..... Minneapolis
Boysen, H. ..... Welcome
Boysen, Peter ..... Pelican Rapids
Braasch, Wm. F. ..... Rochester
Brabec, F. J. ..... Perham
Brabec, P. F. ..... Perham
Bracken, H. M. ..... Claremont, Cal.
Braden, A. J. ..... Duluth
Bradley, E. L. ..... Marion, Ohio
Brand, G. D. ..... St. Paul
Brand, W. A. ..... Redwood Falls
Branham, D. S. ..... Albert Lea
Branton, A. F. ..... Willmar
Branton, B. J. ..... Willmar
Bratrud, A. F. ..... Minneapolis
Bratrud, O. Edw. ..... Warren
Bratrud, Theodor ..... Warren
Bratrude, E. J. ..... Rochester
Braverman, N. J. ..... Duluth
Bray, C. W. ..... Biwabik
Bray, E. R. ..... St. Paul
Bregel, Fred L. ..... St. James
Brigham, C. F. ..... St. Cloud
Brigham, Frank ..... Watkins
Brimhall, J. B. ..... St. Paul
Brodie, Walter D. ..... St. Paul
Broders, A. C. ..... Rochester
Broker, W. S. ..... Battle Lake
Brooks, D. F. ..... St. Paul
Brooks, G. F. ..... St. Paul
Brosseau, J. E. ..... Argyle
Brown, A. E. ..... Rochester
Brown, A. H. ..... Pipestone
Brown, C. B. ..... Rochester
Brown, Edgar D. ..... Minneapolis
Brown, Ed. I. ..... St. Paul
Brown, Edw. J. ..... Minneapolis
Brown, G. E. ..... Rochester
Brown, John C. ..... St. Paul
Brown, Lyle L. ..... Crookston
Brown, P. W. ..... Rochester
Brown, S. E. ..... St. Paul
Browning, W. E. ..... Caledonia
Bruner, Julian M. ..... Rochester
Brunsting, Louis A. ..... Rochester
Buck, Fred H. ..... Shakopee
Buie, L. A. ..... Rochester
Bulkley, Kenneth ..... Minneapolis
Bullen, F. W. ..... Hibbing
Bumpus, H. C. ..... Rochester
Bumpus, Laurin D. ..... Rochester
Bunten, William A. ..... Rochester
Burch, F. E. ..... St. Paul
Burfiend, G. H. ..... St. Paul
Burnap, W. L. ..... Fergus Falls
Burns, F. W. ..... St. Paul
Burns, M. A. ..... Milan
Burns, H. D. ..... Albert Lea
Burns, R. L. ..... Two Harbors
Burns, R. M. ..... St. Paul
Bursheim, P. J. ..... Lake Benton
Busby, James L. ..... Rochester
Burton, Carl G. ..... St. Paul
Busher, H. ..... St. Paul
Butler, John ..... Minneapolis
Button, A. J. ..... Greenbush
Butturff, C. R. ..... Freeborn
Butz, J. A. ..... Monterey
Butzer, John A. ..... Mankato

Buzzelle, L. K. ..... Minneapolis
Byrnes, W. J. ..... Minneapolis

Cabot, George S. ..... Minneapolis
Cabot, V. S. ..... Minneapolis
Cady, L. H. ..... Minneapolis
Caine, C. E. ..... Morris
Caldwell, Jas. P. ..... St. Paul
Caldwell, Kenneth S. ..... St. Paul
Caley, G. R. ..... Princeton
Calhoun, F. W. ..... Albert Lea
Callahan, F. F. ..... Pokegama
Callerstrom, G. W. ..... Minneapolis
Cameron, J. A. ..... St. Paul
Camp, John D. ..... Rochester
Camp, W. E. ..... Minneapolis
Campbell, J. E. ..... South St. Paul
Campbell, L. M. ..... Minneapolis
Campbell, Robert ..... Minneapolis
Cannon, Harry ..... St. Paul
Cantwell, W. F. ..... International Falls
Cardle, Archibald E. ..... Minneapolis
Carey, Jas. B. ..... Minneapolis
Carlaw, C. M. ..... Minneapolis
Carman, C. L. ..... St. Paul
Carman, Paul I. ..... St. Paul
Carmen, J. E. ..... Detroit Lakes
Carmichael, H. T. ..... Rochester
Caron, Robert P. ..... Minneapolis
Carroll, Wm. C. ..... St. Paul
Carstens, C. F. ..... Hibbing
Carter, Fred G. ..... St. Paul
Catlin, John J. ..... Buffalo
Cavanor, F. T. ..... Minneapolis
Cave, Harry A. ..... Rochester
Caylor, Harold D. ..... Rochester
Cervenka, Charles F. ..... New Prague
Chadbourn, A. G. ..... Heron Lake
Chamberlain, H. E. ..... Minneapolis
Chambers, W. C. ..... Blue Earth
Chapman, T. L. ..... Duluth
Chatterton, C. C. ..... St. Paul
Cheleen, S. J. ..... Minneapolis
Cheney, E. L. ..... Duluth
Cherry, Chas. H. ..... Minneapolis
Chesley, A. J. ..... Minneapolis
Christenson, C. R. ..... Starbuck
Christensen, Eli E. ..... Rochester
Christensen, E. P. ..... Two Harbors
Christianson, H. W. ..... Wykoff
Christiansen, A. ..... St. Paul
Christie, G. R. ..... Long Prairie
Christie, R. L. ..... Long Prairie
Christison, J. T. ..... St. Paul
Chumley, Charles L. ..... Rochester
Cirkler, A. A. ..... Minneapolis
Clark, H. B. ..... St. Cloud
Clark, H. S. ..... Minneapolis
Clark, T. C. ..... Minneapolis
Clawson, Thomas A., Jr. ..... Rochester
Clay, F. H. ..... St. Charles
Claydon, Donald R. ..... Red Wing
Claydon, L. E. ..... Red Wing
Clement, J. B. ..... Lester Prairie
Clement, T. G. ..... Duluth
Clifford, F. F. ..... West Concord
Coakley, Leo P. ..... Rochester
Cobb, S. G. ..... St. Paul
Cochrane, W. J. ..... Lake City
Colby, Woodard ..... St. Paul
Cole, H. B. ..... Redwood Falls
Cole, Wallace H. ..... St. Paul
Coleman, F. B. ..... Austin
Coleman, Julian H. ..... Rochester
Collie, H. G. ..... St. Paul
Collins, A. N. ..... Duluth
Collins, H. C. ..... Duluth
Collins, J. S. ..... Wabasha
Colvin, A. R. ..... St. Paul
Combacker, L. C. ..... Fergus Falls
Comfort, Mandred W. ..... Rochester
Comstock, A. E. ..... St. Paul
Condit, W. H. ..... Minneapolis
Conley, Alva A. ..... Cannon Falls
Conner, H. M. ..... Rochester
Conner, Wm. H. ..... Minneapolis
Connor, C. E. ..... St. Paul
Cook, Paul B. ..... St. Paul
Cook, Henry W. ..... Minneapolis
Cooke, Harry H. ..... Rochester
Cooney, H. C. ..... Princeton
Cooper, M. D. ..... Winnebago City
Cooperman, H. O. ..... Minneapolis
Corbeille, Catherine ..... Rochester
Corbett, J. Frank ..... Minneapolis
Corrigan, J. E. ..... Spooner
Corse, C. A. ..... Verndale
Corniea, A. D. ..... Minneapolis
Cosgriff, J. A. ..... Olivia
Cosgrove, J. H. ..... Duluth
Cosman, E. O. ..... Minneapolis
Counsellor, Virgil S. ..... Rochester
Countryman, Roger S. ..... St. Paul
Covell, W. W. ..... St. Peter
Coventry, W. A. ..... Duluth
Cowern, E. W. ..... North St. Paul
Cowing, P. G. ..... Evansville
Crafts, Leo M. ..... Minneapolis
Craig, C. C. ..... International Falls
Craig, Winchell McK. ..... Rochester
Cranmer, Richard R. ..... Minneapolis
Creighton, Ralph H. ..... Minneapolis
Cremer, M. H. ..... Red Wing
Crenshaw, J. L. ..... Rochester
Cress, E. E. ..... Boyd
Cress, P. J. ..... Ellsworth
Crewe, J. E. ..... Rochester
Critchfield, L. R. ..... St. Paul
Cronwell, B. J. ..... Austin
Crowe, E. R. ..... Arlington
Crume, Geo. P. ..... Minneapolis
Crump, J. W. ..... St. Paul
Culver, Lucian G. ..... Stillwater
Culligan, J. M. ..... St. Paul
Culligan, Leo C. ..... St. Paul
Curtin, John F. ..... Minneapolis
Cutts, George ..... Minneapolis

Dack, Lloyd G. ..... St. Paul
Dady, Elmer E. ..... Minneapolis
Dahl, Elmer O. ..... Minneapolis
Dahl, G. A. ..... Mankato
Dahl, John A. ..... Minneapolis
Dahlstrom, A. W. ..... Minneapolis
Daignault, Oscar ..... Benson
Daniel, Donald H. ..... Minneapolis
Daniel, Lewis M. ..... Minneapolis
Daniels, Harry A. ..... Rochester
Daniels, J. W. ..... St. Peter
Danielson, K. A. ..... Litchfield
Darling, J. B. ..... St. Paul
Dart, Leslie O. ..... Minneapolis
Daugherty, E. B. ..... St. Paul
Daugherty, L. E. ..... St. Paul
Davis, Austin C. ..... Rochester
Davis, B. F. ..... Duluth
Davis, F. U. ..... Faribault
Davis, H. S. ..... Duluth
Davis, Herbert ..... St. Paul
Davis, I. Grant ..... Rushford
Davis, John D. ..... Rochester
Davis, Lloyd Thos. ..... Wadena
Davis, Thayer C. ..... Wadena
Davis, William ..... St. Paul
Dawley, Walter A. ..... Rochester
Dean, Arthur C. ..... Crookston
Dean, Benjamin F. ..... Rochester
DeBoer, Hermanus ..... Edgerton
DeCarle, Donald W. ..... Rochester
Decker, Walter J. ..... Rochester
Dedolph, Karl ..... St. Paul
Delmore, J. L. ..... Roseau
Delude, S. ..... Dassel
Dempsey, D. P. ..... Kellogg
Denman, A. V. ..... Mankato
Derauf, B. I. ..... St. Paul
Desjardins, Arthur U. ..... Rochester
Devereaux, T. J. ..... Wayzata
Dewar, J. E. ..... Minneapolis
Deziel, G. ..... Minneapolis
Diehl, Harold S. ..... Minneapolis
Diessner, H. D. ..... Minneapolis
Dickson, Thos. H., Jr. ..... St. Paul
Disen, C. F. ..... Minneapolis
Ditmeier, L. M. G. ..... Jasper
Ditmore, David C. ..... Rochester
Dittman, Geo. C. ..... St. Paul
Dixon, Claude F. ..... Rochester
Dixon, Robert K. ..... Rochester
Dodge, F. A. ..... LeSueur
Dohm, A. J. ..... St. Paul
Dolan, C. P. ..... Worthington
Dolder, F. C. ..... Eyota
Doms, H. C. ..... Slayton
Donohue, Philip F. ..... St. Paul
Doolittle, L. E. ..... Duluth
Donaldson, C. A. ..... Chandler, Ariz.
Dordal, J. ..... Sacred Heart
Dorge, Richard I. ..... Minneapolis
Dornblaser, H. Bright ..... Minneapolis
Down, Howard I. ..... Rochester
Dowswell, W. J. ..... Kerkhoven
Doxley, G. L. ..... Minneapolis
Doyle, J. B. ..... Rochester
Drake, Carl B. ..... St. Paul
Drake, C. R. ..... Minneapolis
Drake, F. A. ..... Lanesboro
Dredge, H. P. ..... Sandstone
Dreisbach, N. ..... Minneapolis
Drenning, F. C. ..... Duluth
Drips, D. G. ..... Rochester
Drought, W. W. ..... Fergus Falls
Dubbe, F. H. ..... New Ulm
DuBois, J. A. ..... Sauk Center
DuBois, J. F. ..... Sauk Center
Dudley, J. H. ..... Windom
Duff, Edwin R. ..... Minneapolis
Duncan, Henry ..... Marietta
Dungay, Neil S. ..... Northfield
Dunlap, E. H. ..... Minneapolis
Dunlap, H. F. ..... Rochester
Dunlop, Alex. ..... Crookston
Dunn, Geo. R. ..... Minneapolis
Dunn, J. N. ..... St. Paul
Dunne, Gerald P. ..... St. Paul
Dunsmoor, F. A. ..... Minneapolis
Durgin, F. L. ..... Winnebago
Dutton, C. E. ..... Minneapolis
Dworsky, Samuel D. ..... Minneapolis

Earl, George A. ..... St. Paul
Earl, Robert O. ..... St. Paul
Eberlin, E. A. ..... Glenwood
Eby, C. B. ..... Spring Valley
Eckman, P. F. ..... Duluth
Eckstein, A. W. ..... Comfrey
Edlund, G. ..... St. Paul
Edstrom, Henry ..... Crookston
Edwards, Ralph T. ..... Elysian
Egilsrud, Kristian ..... Minneapolis
Ehrenberg, C. J. ..... Minneapolis
Eich, Matthew ..... Minneapolis
Eisenman, W. A. ..... Chisholm
Eitel, Geo. D. ..... Minneapolis
Ekblad, J. W. ..... Duluth
Eklund, E. J. ..... Norwood
Eklund, Wm. J. ..... Duluth
Elias, F. J. ..... Duluth
Ellingson, A. R. ..... Detroit Lakes
Ellison, Frank E. ..... Monticello
Ellison, David E. ..... Minneapolis
Elsey, J. R. ..... Glenwood
Ely, O. S. ..... South St. Paul
Emerson, E. C. ..... St. Paul
Engberg, E. J. ..... St. Paul
Engelhart, P. C. ..... Minneapolis
Engstrand, Oscar J. ..... Warren
Eppard, R. M. ..... Cloquet
Erb, F. A. ..... Minneapolis
Erdmann, C. A. ..... Minneapolis
Ericson, J. A. ..... Minneapolis
Ericson, Swan ..... LeSueur
Ericksen, L. G. ..... Wood Lake
Erickson, J. L. ..... Twin Valley
Ernest, G. C. ..... St. Paul
Ertel, E. Q. ..... Ellendale
Eshelby, E. C. ..... St. Paul
Esser, John ..... Perham
Estrem, C. O. ..... Fergus Falls
Estrem, T. A. ..... Hibbing
Eubanks, George F. ..... Rochester
Eusterman, G. B. ..... Rochester
Evans, Edward T. ..... Minneapolis
Evarts, Arrah B. ..... Rochester
Everlof, J. L. ..... Minneapolis
Ewens, H. B. ..... Virginia
Ewing, C. F. ..... Wheaton

Fahey, E. W. ..... St. Paul
Fallon, John M. ..... Rochester
Fansler, W. A. ..... Minneapolis
Farabaugh, Charles L. ..... Minneapolis
Farrish, R. C. ..... Sherburn
Faust, Louis S. ..... Rochester
Fauster, John U., Jr. ..... Rochester
Fauth, Karl J. ..... Gaylord
Fawcett, A. Maxwell ..... Granite Falls
Fawcett, C. E. ..... Stewartville
Farr, R. E. ..... Minneapolis
Feeney, John M. ..... Minneapolis
Fehland, Harold R. ..... Rochester
Fenger, E. ..... Oak Terrace
Ferguson, J. C. ..... St. Paul
Ferreira, Gideon J. ..... Duluth
Fesler, Harold H. ..... St. Paul
Figi, F. A. ..... Rochester
Fiksdal, M. J. ..... Willmar
Fink, Walter H. ..... Minneapolis
Finney, W. P., Jr. ..... Rochester
Fisch, Herbert M. ..... Austin
Fischer, G. ..... Minneapolis
Fischer, H. P. ..... Shakopee
Fischer, Mario McC. ..... Duluth
Fischer, P. M. ..... Shakopee
Fjeldstad, C. Alford ..... Minneapolis
Flagstad, A. E. ..... St. Paul
Fleischhauer, D. S. ..... Wabasha
Fleming, A. S. ..... Minneapolis
Fleming, James ..... Cloquet
Fleming, T. N. ..... St. Cloud
Flinn, B. P. ..... Redwood Falls
Flinn, T. E. ..... Redwood Falls
Flocken, Chas. F. ..... Pasadena, Calif.
Flom, A. O. ..... Chisago City
Flower, W. Z. ..... Minneapolis

Fogarty, Chas. W.....St. Paul
Foley, F. E. B.....St. Paul
Folken, F. G.....Albert Lea
Forbes, Robert S.....Duluth
Ford, Burton C.....Marshall
Ford, Frances A.....Rochester
Forrest, C. G.....Clearbrook
Fortin, Harry J.....Rochester
Fortney, G. O.....Zumbrota
Foshager, Henry T.....Clara City
Foster, Wilmot C.....Rochester
Fowler, Louis McCargo.....Rochester
Fowler, L. H.....Minneapolis
Fox, Ben.....Rochester
Franchere, F. W.....Lake Crystal
Francis, David W.....Morristown
Fredericks, George M.....Minneapolis
Frederickson, Alice C.....Lake Lillian
Frederickson, C. H.....Rochester
Frederickson, Guy U. Y.....Lake Lillian
Freeborn, J. A.....Fergus Falls
Freed, O. J. R.....Cokato
Freeman, C. D.....St. Paul
Freeman, Geo. H.....St. Peter
Freeman, W. L.....St. Cloud
Freeman, J. P.....Albert Lea
Freligh, W. P.....Albert Lea
French, H. S.....Duluth
Freymiller, E. F.....Markville
Friedell, A.....Minneapolis
Fricke, Robert E.....Rochester
Friesleben, Wm.....Sauk Rapids
Fritsche, Albert.....New Ulm
Fritsche, L. A.....New Ulm
Froats, C. W.....Eveleth
Froelich, H. W.....Thief River Falls
Frost, E. H.....Willmar
Frost, Harry T.....Wadena
Frost, Russell H.....Wabasha
Fugina, George R.....Mankato
Fulcher, Oscar H.....Rochester
Fulton, J. F.....St. Paul
Funk, Victor K.....Oak Terrace

Gaarde, F. W.....Rochester
Gager, E. C.....St. Paul
Gaines, E. C.....Buffalo Lake
Gaalaas, A. F.....Wadena
Gallagher, B. J.....Waseca
Gamble, J. W.....Albert Lea
Gamble, P. M.....Albert Lea
Gamble, R. M.....Albert Lea
Gammell, J. H.....Minneapolis
Garand, J. H.....Dayton
Garbrecht, Arthur.....St. Paul
Gardiner, D. G.....St. Paul
Gardner, Edwin L.....Minneapolis
Gardner, V. H.....Fairmont
Gault, C. C.....Owatonna
Geer, Everett K.....St. Paul
Gehlen, J. N.....St. Paul
Geist, Emil S.....Minneapolis
Geist, George A.....St. Paul
Gelz, J. J.....St. Cloud
Gerber, Milo P.....Brainerd
Germo, Chas.....Balaton
Ghent, C. Harry.....St. Paul
Ghent, M. M.....St. Paul
Gibbons, Francis C.....Comfrey
Gibbon, L. L.....Lowry
Giere, E. O.....Minneapolis
Giere, J. C.....Minneapolis
Giere, Richard W.....Minneapolis
Giere, S. W.....Benson
Giesen, A. F.....Starbuck
Giessler, Paul W.....Minneapolis
Giffin, H. Z.....Rochester
Gilfillan, J. S.....St. Paul
Gillespie, M. G.....Duluth
Gillespie, N. H.....Duluth
Gingold, Benj. A.....Minneapolis
Ginsberg, Wm.....St. Paul
Gleason, Notery A.....Rochester
Goblirsch, A. P.....Sleepy Eye
Goeckerman, W. H.....Rochester
Goehrs, H. W.....St. Cloud
Goforth, Clifford.....St. Peter
Goldberg, Isadore M.....Minneapolis
Golden, C. M.....Tyler
Goltz, E. V.....St. Paul
Good, Louis P.....Rochester
Good, Ralph W.....Rochester
Gorder, Arne C.....Rochester
Gordon, Geo. J.....Minneapolis
Gosin, D. F.....Minneapolis
Gosslee, G. L.....Moorhead
Gowan, L. R.....Duluth
Graham, A. Stephens.....Rochester
Graham, David.....Duluth
Graham, R. D.....Duluth
Graham, Robert.....Duluth

*Deceased.

Grant, H. W.....St. Paul
Gratzek, Thos.....St. Paul
Grave, Floyd.....Minneapolis
Graves, W. N.....Duluth
Grawn, F. A.....Duluth
Gray, F. D.....Marshall
Greeley, L. O.....Duluth
Green, E. K.....Minneapolis
Greene, Carl H.....Rochester
Greene, Chas. L.*.....St. Paul
Greene, W. P.....Minneapolis
Greenlee, Daniel P.....Rochester
Greisheimer, Esther M.....Minneapolis
Griffin, P. J.....Fertile
Grier, James P.....Rochester
Grimes, H. B.....Madelia
Grinnell, W. B.....Preston
Grise, W. B.....Austin
Grogan, J. S.....Wadena
Groschupf, Theo. P.....Bemidji
Grose, Fredk. N.....Clarissa
Ground, H. T.....Virginia
Gruenhagen, Arnold P.....Virginia
Gullixson, A.....Albert Lea
Gunderson, Nels A.....Minneapolis
Gunderson, R. M.....Lake Park

Habein, Harold C.....Rochester
Haberman, E.....Osakis
Hacking, Frank H.....Minneapolis
Haddow, N. W.....Minneapolis
Haessley, S. B.....Faribault
Hagaman, Geo. K.....St. Paul
Hagen, G. L.....Minneapolis
Hagen, H. O.....New Richland
Hagen, O. E.....Butterfield
Hagen, Olaf J.....Moorhead
Haggard, G. D.....Minneapolis
Haines, J. H.....Stillwater
Haines, S. F.....Rochester
Haldeman, Keene O.....Rochester
Halenbeck, Philip L.....St. Cloud
Hall, A. R.....St. Paul
Hall, E. L.....Princeton
Hall, Henry H.....St. Paul
Hall, J. M.....Minneapolis
Hall, S. S.....Minneapolis
Hallberg, C. A.....Minneapolis
Hallenbeck, D. F.....Rochester
Halloran, Walter.....Jackson
Halper, Philip.....St. Paul
Hamel, Arnold L.....Minneapolis
Hamilton, A. S.....Minneapolis
Hamlin, George B.....Minneapolis
Hammermeister, T. F.....New Ulm
Hammes, E. M.....St. Paul
Hammond, A. J.....Minneapolis
Hammond J. F.....St. Paul
Hamrick, Robert A.....Rochester
Hand, John R.....Rochester
Hand, W. R.....Elbow Lake
Hane, Richard L.....Rochester
Haney, C. L.....Duluth
Hanlon, Frank R.....Rochester
Hannah, Hewitt B.....Minneapolis
Hansen, Erling.....Minneapolis
Hansen, M.....Ada
Hansen, Olga S.....Minneapolis
Hanson, A. M.....Faribault
Hanson, H. J.....Minneapolis
Hanson, H. V.....St. Paul
Hanson, William A.....Minneapolis
Harmon, G. E.....St. Paul
Hare, E. R.....Minneapolis
Harriman, L.....Howard Lake
Harrington, C. D.....Minneapolis
Harrington, F. E.....Minneapolis
Harrington, S. W.....Rochester
Harris, C. N.....Chisholm
Hart, Alfred B., Jr.....Owatonna
Hart, William E.....Minneapolis
Hartfiel, Wm. F.....St. Paul
Hartley, E. C., Jr.....St. Paul
Hartman, Howard R.....Rochester
Hartwell, Shattuck W.....Rochester
Hartzell, John B.....Rochester
Hartzell, Thos. B.....Minneapolis
Haskell, A. D.....Alexandria
Haskins, John L.....King's Park, N. Y.
Hassett, Roger G.....Mankato
Hastings, D. R.....Minneapolis
Hatch, W. E.....Duluth
Hathaway, J. C.....Minneapolis
Hathaway, S. J.....Proctor
Hauge, M. M.....Clarkfield
Hauser, V. P.....St. Paul
Havens, Fred Z.....Rochester
Havens, John G. W.....Austin
Haverfield, Addie R.....Minneapolis
Hawkins, V. J.....St. Paul
Hawkinson, L. F.....Brainerd
Hawkinson, John P.....Crosby
Hayes, J. M.....Minneapolis

Hayes, M. F.....Nashwauk
Haynes, A. L.....Faribault
Haynes, B. H.....St. James
Head, G. D.....Minneapolis
Healy, R. T.....Pierz
Hearn, Wm. O.....Minneapolis
Heath, A. C.....St. Paul
Hebeisen, M. B.....Carver
Heck, Frank Joseph.....Rochester
Heck, Wm. W.....St. Paul
Hedback, A. E.....Minneapolis
Hedenstrom, F. G.....St. Paul
Hefke, Hans W.....Rochester
Hegge, O. H.....Austin
Heiberg, E. A.....Fergus Falls
Heimark, J. H.....Moorhead
Heimark, J. J.....Blue Earth
Heimark, O. E.....Duluth
Heimdal, Clarence O.....Rochester
Heise, W. F. C.....Winona
Helk, H. H.....Minneapolis
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hemstead, Werner.....St. Cloud
Hench, Philip S.....Rochester
Henderson, A. J.....Kiester
Henderson, M. S.....Rochester
Hendrickson, J. F.....Minneapolis
Hengstler, W. H.....St. Paul
Henney, Wm. H.....McIntosh
Henriksen, H. G.....Elko
Henry, C. E.....Minneapolis
Henry, Myron O.....Minneapolis
Hensel, C. N.....St. Paul
Henslin, A. E.....LeRoy
Herbolsheimer, A. J.....Minneapolis
Herbst, Wm. P.....Minneapolis
Herman, Arthur L.....Minneapolis
Hermanson, Peter E.....Ivanhoe
Herrmann, Edgar T.....St. Paul
Herrmann, S. F.....Rochester
Hertel, G. E.....Austin
Hesselgrave, S. S.....St. Paul
Heyerdale, O. C.....Rochester
Hiebert, J. P.....Minneapolis
Hielscher, J. A.....Mankato
Higbee, Paul A.....Minneapolis
Higgins, J. H.....Minneapolis
Hilger, J. M.....Iona
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, L. A.....St. Paul
Hill, Eleanor J.....Minneapolis
Hill, Frederick Charles.....Rochester
Hill, Frederick E.....Duluth
Hilton, J. M.....Browerville
Hiniker, Louis P.....St. Paul
Hirschfelder, A. D.....Minneapolis
Hirschfield, M. S.....Duluth
Hirschboeck, F. J.....Duluth
Hirshfield, F. R.....Minneapolis
Hitchings, W. S.....Lakefield
Hoaglund, A. W.....Minneapolis
Hobbs, C. A.....Minneapolis
Hochfilzer, J. J.....St. Paul
Hodapp, R. J.....Willmar
Hodge, S. V.....Minneapolis
Hodgson, H. H.....Crookston
Hoff, Alfred.....St. Paul
Hoffman, Max H.....St. Paul
Hoidale, A. D.....Tracy
Holbrook, J. S.....Mankato
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Hoiland, A. S.....Minneapolis
Holen, T.....Minneapolis
Holl, P. M.....Minneapolis
Holland, Wilbur Wallace.....Rochester
Hollands, W. H.....Fisher
Holm, C. E.....Isle
Holm, Geo. A.....Minneapolis
Holm, H. H.....Glencoe
Holm, P. F.....Wells
Holman, C. J.....Mankato
Holmberg, L. J.....Canby
Holmes, A. E.....Rush City
Holmes, W. B.....Ada
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
Holt, John E.....St. Paul
Holt, Wm. B.....Minneapolis
Holtan, Theodore.....Waterville
Holte, H.....Crookston
Horton, Bayard T.....Rochester
Houkom, Bjarne.....Fergus Falls
House, Z. E.....Cass Lake
Hovde, H.....Duluth
Hovde, Rolf.....Winthrop
Howard, M. I.....Mankato
Howard, W. S.....St. Paul
Huenekens, E. J.....Minneapolis

Huffman, Lester D. Los Angeles, Cal.
Hughes, Louis D. Minneapolis
Hultkrans, Joel C. St. Paul
Hultkrans, R. E. Rush City
Humiston, Homer W. Rochester
Humphrey, E. W. Moorhead
Humphrey, W. R. Stillwater
Hunt, F. N. Fairmont
Hunt, H. E. St. Paul
Hunt, Henry Franklin Rochester
Hunt, R. C. Fairmont
Hunt, V. C. Rochester
Hunte, A. F. Truman
Hurt, Algernon Smith, Jr. Rochester
Huseby, H. W. Cloquet
Hutchinson, Charles J. Minneapolis
Huxley, Frederick E. Faribault
Hymes, Charles Minneapolis
Hynes, James Minneapolis
Hynes, John E. Minneapolis

Ide, A. W. St. Paul
Ikeda, Kano St. Paul
Irvine, H. G. Minneapolis
Irwin, Alex F. Minneapolis

Jackson, C. M. Minneapolis
Jacobs, A. C. Elmore
Jacobs, Jno. C. Willmar
Jacobs, Minerd F. Rochester
Jacobson, Clarence Chisholm
Jacobson, David J. Blackduck
Jacquot, G. L. Marshall
James, J. H. Mankato
Jamieson, Earl Walnut Grove
Jennings, Frank L. Oak Terrace
Jennings, Mary H. Minneapolis
Jensen, A. H. Hutchinson
Jensen, Harry Minneapolis
Jensen, M. J. Minneapolis
Jensen, T. J. Duluth
Johnson, A. E. Red Wing
Johnson, A. E. Minneapolis
Johnson, A. Elof Minneapolis
Johnson, Asa M. St. Paul
Johnson, C. E. St. Paul
Johnson, C. M. Dawson
Johnson, Ellsworth Windom
Johnson, E. W. Bemidji
Johnson, H. P. Fairmont
Johnson, Hartland C. St. Paul
Johnson, Hans Kerkhoven
Johnson, H. M. Dawson
Johnson, James A. Minneapolis
Johnson, Julius Minneapolis
Johnson, Nimrod A. Minneapolis
Johnson, Norman Minneapolis
Johnson, O. V. Sebeka
Johnson, R. A. Minneapolis
Johnson, Ray G. St. Paul
Johnson, Selmer M. Minneapolis
Johnson, T. H. St. Paul
Johnson, Walfred Sauk Center
Johnson, Walter R. Rochester
Jones, A. W. Red Wing
Jones, D. C. St. Paul
Jones, E. M. St. Paul
Jones, G. M. Minneapolis
Jones, H. T. Rochester
Jones, H. W. Minneapolis
Jones, Richard N. St. Cloud
Jones, Robert Du Vae Rochester
Jones, W. A. Minneapolis
Jones, William R. Minneapolis
Jordan, Ferdinand M. Rochester
Josewich, Alexander Minneapolis
Josewski, R. J. Stillwater
Joyce, George Leo Stewartville
Joyce, G. T. Rochester
Judd, E. S. Rochester
Judge, Walter T. Graceville
Juergens, H. M. Belle Plaine
Juliar, R. O. St. Clair
Just, Herman J. Lafayette

Kaasa, L. J. Albert Lea
Kadesky, David St. Paul
Kahala, Arthur Crookston
Kalinoff, D. Stillwater
Kamman, Gordon R. St. Paul
Kamp, B. A. Albert Lea
Kannary, E. L. St. Paul
Kanne, C. W. Faribault
Karn, B. R. Ortonville
Kaufman, A. J. Franklin
Kaufman, Wm. C. Appleton
Kean, N. D. Coleraine
Keith, N. M. Rochester
Kelling, Louis F. Lakefield
Kelly, John V. St. Paul
Kelly, Paul H. St. Paul
Kelsey, C. G. Hinckley
Kemp, A. F. Mankato
Kemp, M. W. Fergus Falls
Kendahl, A. M. Jasper
Kennedy, C. C. Minneapolis
Kennedy, Jane F. Minneapolis
Kennedy, Roger L. J. Rochester
Kennedy, R. Roy Minneapolis
Kennedy, W. A. St. Paul
Kenny, H. F. St. Paul
Kenyon, Paul Wadena
Kepler, Edwin J. Rochester
Kerlan, M. Bemidji
Kerlan, S. Z. Aitkin
Kern, M. J. St. Cloud
Kernkamp, Leila Minneapolis
Kernohan, James W. Rochester
Kerschbaumer, Louisa St. Peter
Kertesz, G. Arlington
Kesting, Herman St. Paul
Keyes, C. R. Duluth
Keyes, E. D. Winona
Kibbe, O. A. Minneapolis
Kiefer, M. A. Sleepy Eye
Kierland, P. E. Alexandria
Kiesling, I. H. Nashwauk
Kilbourne, A. F. Rochester
Kilbride, E. A. Worthington
Kilbride, J. S. Canby
King, E. A. Minneapolis
King, George L. St. Paul
King, Harry T. Minneapolis
King, W. R. Minneapolis
King, W. S. Eveleth
King, Z. P. St. Paul
Kingsbury, E. M. Clearwater
Kinsella, Thomas J. Oak Terrace
Kirk, G. P. East Grand Forks
Kistler, A. J. Minneapolis
Kistler, A. S. St. Paul
Kistler, C. M. Minneapolis
Kittelson, T. N. Fergus Falls
Klaveness, E. Monticello
Klein, Harry Duluth
Klein, H. N. St. Paul
Klima, W. W. Stewart
Kliman, F. E. Duluth
Knapp, F. N. Duluth
Knauff, M. K. St. Paul
Knight, Ralph T. Minneapolis
Knight, Ray R. Minneapolis
Koch, John C. Minneapolis
Koenigsberger, Chas. Mankato
Kohlbry, C. O. Duluth
Kohler, D. W. St. Joseph
Kolars, J. J. Le Sueur Center
Koller, Herman M. Minneapolis
Koller, L. R. Minneapolis
Kolset, Carl D. Sanborn
Koop, Herman E. Cold Springs
Koop, S. H. Richmond
Kooiker, Herman J. Milaca
Kraft, Peter Duluth
Kremer, Walter J. Minneapolis
Kriedt, Daniel Minneapolis
Kucera, Frank Jos. Hopkins
Kucera, Wm. J. Minneapolis
Kuhlman, August Melrose
Kusske, A. L. New Ulm
Kuth, J. R. Duluth
Kvitrud, G. St. Paul

Lacy, Nicholas E. Rochester
Laird, A. T. Nopeming
Lajoie, John M. Minneapolis
Langenderfer, F. V. St. Paul
Langhoff, A. H. Glencoe
Laney, R. L. Puposky
Lannin, J. C. Mabel
Lapierre, A. P. Minneapolis
Lapierre, C. A. Minneapolis
Lapierre, J. T. Minneapolis
Larsen, C. L. St. Paul
Larsen, O. O. Detroit Lakes
Larson, Clarence M. Minneapolis
Larson, A. L. Philadelphia, Pa.
Larson, Lawrence M. Rochester
Larson, L. M. St. Paul
Larson, M. L. St. Paul
Laughlin, J. T. Grey Eagle
Laurent, A. A. Minneapolis
LaVake, R. T. Minneapolis
Lax, Morris H. St. Paul
Lazar, H. L. Minneapolis
Leahy, Bartholomew St. Paul
Leavenworth, R. O. St. Paul
Leavitt, H. H. Minneapolis
Lebowski, Joseph A. Minneapolis
Leck, Clifford C. Austin
LeClerc, J. E. Le Sueur
Leddy, Eugene T. Rochester
Lee, H. M. Minneapolis
Lee, J. L. Watertown
Lee, W. A. Fergus Falls
Lee, Walter N. Madison
Leebens, J. H. Lismore
Leibold, H. H. Parkers Prairie
Leitch, Archibald St. Paul
Leitch, N. M. Warroad
Leland, Harold R. Minneapolis
Leland, John T. Herman
Leland, M. N. Minneapolis
Lemon, W. S. Rochester
Lemstrom, Jarl Minneapolis
Lenander, Melvin E. St. Peter
Lenont, C. B. Virginia
Leonard, L. J. Minneapolis
Leonard, Gilbert J. St. Paul
Lepak, F. J. Duluth
Lepak, John A. St. Paul
Leopard, B. A. Bywood, Pa.
Lerch, William Cable, Wis.
Leuty, Amos Morris
Lewis, A. J. Henning
Lewis, C. B. St. Cloud
Lewis, Charles F. Austin
Lewis, W. W. St. Paul
Lexa, F. J. Lonsdale
Libert, John N. St. Cloud
Lichtenstein, H. Winona
Lick, C. Louis St. Paul
Liedloff, A. G. Mankato
Lillie, H. I. Rochester
Lillie, W. I. Rochester
Lima, Ludvig Montevideo
Lind, C. J. Minneapolis
Lindberg, A. L. Wheaton
Linde, Herman Cyrus
Lindquist, R. H. Minneapolis
Lindsay, W. V. Winona
Linner, H. P. Minneapolis
Linton, W. B. Minneapolis
List, Walter E. Minneapolis
Litchfield, John T. Minneapolis
Litman, Samuel N. Duluth
Little, N. J. St. Paul
Litzenberg, J. C. Minneapolis
Lloyd, H. J. Mankato
Locken, O. E. Crookston
Lodmell, Elmer A. Wadena
Logan, A. H. Rochester
Logan, F. W. Blue Earth
Logefeil, Rudolph C. Minneapolis
Lommen, A. P. Lanesboro
Lommen, P. A. Austin
Loofbourrow, Elias H. Keewatin
Long, Jesse Minneapolis
Loomis, E. A. Minneapolis
Loughery, Harold B. Rochester
Love, Fred A. Carlos
Lowe, Earl R. So. St. Paul
Lowe, Thomas A. So. St. Paul
Lowe, Thos. Pipestone
Luden, Georgine Rochester
Luedtke, G. H. Fairmont
Lum, C. E. Duluth
Lund, Arthur E. St. Paul
Lundgren, A. C. Minneapolis
Lundholm, A. M. St. Paul
Lundquist, E. F. Minneapolis
Lundy, John S. Rochester
Lynch, M. J. Minneapolis
Lyng, John A. Minneapolis
Lyon, E. P. Minneapolis
Lysne, Henry Minneapolis

McBeath, Ewing C. N. Y. City
McBride, William P. Rochester
McBroom, D. E. Cambridge
McCann, James C. Rochester
McCarthy, Donald Minneapolis
McCarthy, W. J. Madelia
McCarthy, W. R. St. Paul
McCartney, James S. Minneapolis
McCarty, P. D. Ely
McCarty, Ray B. Rochester
McClanahan, J. H. White Bear
McClanahan, T. S. White Bear
McCloud, C. N. St. Paul
McComb, C. F. Duluth
McCoy, Mary Duluth
McCrea, James Fulda
McCuskey, Chas. F. Rochester
McDaniel, Orianna Minneapolis
McDaniel, S. P. Mountain Iron
McDonald, A. L. Duluth
McDonell, C. H. Winona
McDowell, J. P. St. Cloud
McEachran, A. Minneapolis
McFarland, A. H. Minneapolis
McGandy, R. F. Minneapolis
McGeary, Geo. E. Minneapolis
McGiffert, E. N. Duluth
McGroarity, J. J. Easton

McGuigan, H. T. Red Wing
McHaffie, O. L. Duluth
McHugh, Roderick F. Aitkin
McIntire, H. M. Waseca
McIntyre, E. H. Virginia
McIntyre, John A. Owatonna
McKaig, Carle B. Pine Island
McKechnie, Wilfred St. Peter
McKenna, J. K. Austin
McKeon, J. O. Montgomery
McKeon, James St. Paul
McKeon, Owen St. Paul
McKeown, E. G. Pipestone
McKibben, H. E. St. Cloud
McKinlay, C. A. Minneapolis
McKinley, J. C. Minneapolis
McKinney, F. S. Minneapolis
McKinnon, J. J. Wadena
McLaren, Jeanette M. St. Paul
McLaughlin, E. M. Winona
McNevin, C. F. St. Paul
McNutt, John R. Barnum
MckRuby, Fred Hibbing
McQuiggan, Mark R. Rochester
McPheeters, H. O. Minneapolis
McVicar, Chas. S. Rochester
Macbeth, J. L. St. Clair
MacDonald, A. E. Minneapolis
MacDonald, D. A. Minneapolis
MacDonald, Irving C. Minneapolis
Macfarlane, P. H. Chisholm
MacRae, Gordon C. Duluth
Mach, Frank B. Minneapolis
Maertz, W. F. New Prague
Magath, T. B. Rochester
Magee, Henry R. Rochester
Magie, W. H. Duluth
Magiera, Estelle A. Minneapolis
Magney, F. H. Duluth
Mahorner, Howard R. Rochester
Mahowald A. Albany
Maland, C. O. Minneapolis
Malmgren, George E. Rochester
Manley, James R. Duluth
Mann, A. T. Minneapolis
Manson, F. M. Worthington
Marcley, W. J. Minneapolis
Marcum, E. H. Bemidji
Margolis, Harry M. Rochester
Mariette, Ernest Oak Terrace
Mark, D. B. Minneapolis
Marken, M. H. Fairmont
Marshall, James M. Rochester
Martin, Edw. T. Duluth
Martin, W. C. Duluth
Martineau, J. L. St. Paul
Martinson, C. J. Wayzata
Masson, D. M. Rochester
Masson, J. C. Rochester
Matchan, Glen R. Minneapolis
Matthews, Justus Minneapolis
Mattill, B. M. Oak Terrace
Mattson, Hamline Rochester
Mattison, P. A. Winona
Maxeiner, Stanley R. Minneapolis
May, James Alan Rochester
May, W. H. Minneapolis
Mayland, M. L. Faribault
Mayne, Roy M. Duluth
Mayo, C. H. Rochester
Mayo, Charles W. Rochester
Mayo, Joseph G. Rochester
Mayo, W. J. Rochester
Maytum, Charles K. Rochester
Mead, Marion A. Minneapolis
Meckstroth, C. W. Brandon
Mee, P. H. Osseo
Meighen, J. W. Ulen
Meierding, Wm. A. New Ulm
Meilicke, W. A. Nicollet
Meinert, A. E. Winona
Meland, Ernest L. Dalton
Melby, Benedik Blooming Prairie
Mellby, O. F. Thief River Falls
Melzer, G. R. Lyle
Mercil, William F. Crookston
Merkert, Charles E. Minneapolis
Merkert, G. L. Minneapolis
Merriman, L. L. Duluth
Mesker, G. H. Olivia
Meyer, A. A. Melrose
Metheny, David Rochester
Meyer, E. L. Minneapolis
Meyer, P. F. Faribault
Meyerding, E. A. St. Paul
Meyerding, H. W. Rochester
Michael, J. C. Minneapolis
Michelson, H. E. Minneapolis
Miller, Charles D. Rochester
Miller, H. A. Fairmont
Miller, V. L. Mankato
Miller, W. A. New York Mills
Mills, J. L. Winnebago
Mills, Ralph G. Rochester
Mingo, F. E. Hugo
Mitchell, A. B. Hector
Mitchell, Frederick St. Paul
Mitchell, R. S. Grand Meadow
Moe, Russel J. Duluth
Moe, Thomas Moose Lake
Moffatt, A. G. Howard Lake
Mogilner, S. N. St. Paul
Moench, Mary Rochester
Moersch, F. P. Rochester
Moersch, H. J. Rochester
Mohardt, John H. Rochester
Moir, Wm. W. Minneapolis
Molander, H. A. St. Paul
Monahan, R. H. Minneapolis
Monroe, P. B. Two Harbors
Montgomery, Hamilton Rochester
Moore, A. B. Rochester
Moore, Thomas B. Rochester
Moorhead, M. B. Minneapolis
Moquin, Marie A. St. Paul
More, C. W. Eveleth
Moren, Edwin Minneapolis
Moriarty, Cecile R. Minneapolis
Mork, B. O. Worthington
Morley, G. A. Crookston
Morrison, A. W. Minneapolis
Morrissey, F. B. St. Paul
Morrow, James J. Austin
Morse, M. P. LeRoy
Morsman, L. W. Hibbing
Morss, C. R. Zumbrota
Mortenson, N. G. St. Paul
Morton, Herschel B. Rochester
Moses, Joseph, Jr. Northfield
Moss, Myer N. St. Paul
Moynihan, A. F. Sauk Center
Moynihan, T. J. St. Paul
Moyer, Ralph E. Bemidji
Mroz, Rudolph J. Rochester
Muir, E. C. Minneiska
Mulholland, Stanford W. Rochester
Muller, R. Theo. St. Paul
Murdoch, J. M. Faribault
Murphy, George T. Rochester
Murphy, Ignatius J. Minneapolis
Murphy, Leo Minneapolis
Murray, D. D. Duluth
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ANGIONEUROTIC EDEMA

WITH REPORT OF CASE

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ANGIONEUROTIC edema was first described by Stolpertus in 1778. Either his description was inadequate, or it has simply been lost in the maze of ancient documents, for Milton is conceded to be the first recognized author on the subject. His work consisted of reports of four cases, and a questionable fifth one presented to the Medico-Chirurgical Society of London and published in the Edinburgh Medical Journal of 1878. Two years before, he had published one of these case records. Bannister, Goetz, and Laudon, in 1880, each recognized instances of the same affliction, and made known their experiences with it through the columns of different medical periodicals.

As a result of a very comprehensive study of the malady, which appeared under the title of "Acute Circumscribed Edema of the Skin," in 1882, Quincke has been honored in that the syndrome has since borne his name. In the same year another milepost was passed in the discovery of the hereditary form by Dinklelaker, one of Quincke's students. Strubing, in 1885, first suggested the name of "Angioneurotic Edema," under which title most subsequent records have been made. Though Dinklelaker, Strubing and Falcone observed the hereditary form previously, Osler, in 1888, added to the literature the first striking example of the inherited type of the disease. His article gave the history of a family in which it was present in five generations, and some years later he found the sixth generation of the same family affected.

Cassirer, in 1901, collected 210 cases from the literature, and in a very lengthy monograph depicts the various phases of the subject more thoroughly than had been done before. Also deserving of mention is Bullock, who, in 1909, collected 170 cases. His work is particularly valuable for its treatment of the familial transmission of the disease. The literature has gradually but steadily increased with but few real momentous contributions. Among those of greater importance are the articles by Crowder and Crowder on the familial form, the works of Williams, Phillips and Menagh on etiology, and the papers of Fox, Morris, Harbitz, Griffith, Wason, and Harrington concerning the pathology.

CLINICAL FEATURES

Angioneurotic edema is characterized by transient edematous swellings of various sizes having predilection for the face, hands, arms, legs, gluteal regions, genitalia, and throat. Sometimes allied with these swellings are nausea, vomiting, diarrhea, colic, melena, hemiplegia, hematuria, cardialgia, and death from edema of the glottis. The swellings vary in extent, and are raised, usually markedly, above the level of the surrounding tissue. They are usually pale in color, though at times they are described as pink or erythematous. In consistency they are firm, elastic and do not pit on pressure. Accompanying the edema may be found such sensations as prickling, pain, burning, itching and a feeling of tension. The duration varies from a few hours to several days. These lesions during the early course of the disease appear at intervals of one or more months. Later the intermissions are shorter, varying from several days to one or two weeks. In some cases, as for instance that of Matas, the periodicity is very striking.

Besides the superficial skin lesions, there is often involvement of the pharynx and glottis, the stomach and intestines, the brain, lungs, heart, and genito-urinary system. Death most frequently occurs in the hereditary cases from ede-

ma of the glottis. Mortality has been reported as high as 51.5 per cent in one series.

INCIDENCE

As to sex incidence, Cassirer found, in his series of 210 cases, 111 males and 99 females affected. Menagh in a series of 260 cases of urticaria or angioneurotic edema, which were not more definitely classified, discovered that 168 were females and 92 males. From a small series of 123 cases collected from the literature for this paper, 66 were males, 51 females, and in six cases the sex was not stated. These figures represent some of those cases considered in Cassirer's statistics. In Osler's inherited cases, there were seven males and ten females. Crowder cites 13 males and 14 females afflicted. Including these instances of the familial type the present series shows 27 male cases, 26 female cases, and one in which no sex was mentioned.

No statistics have been noted concerning the age incidence. This fact may be due to variation in stating the patient's age, some reports giving the age when first subject to the disorder, others giving the age of the patient when first attended regardless of age at onset, and still others giving only the age at time of death. As a consequence, statistics on this aspect of the question may be incorrect and variable. From the 89 cases found, with stated ages at the time when first seen by medical attendants, the average age is found to be 28.2 years. The age most frequently encountered is 30 years, there being six instances at this period of life and only five at twenty-one years, the age next in frequency. Other ages show a range from one week to ninety years.

ETIOLOGY

It was from the point of view of seeking a relation in etiology of the two groups, inherited and allergic, and in an effort to study the pathology, that this paper was first suggested. Even though one class of cases is of familial origin could not they, too, result from allergy or anaphylaxis? A great deal of work has been done in this field, and an effort will be made to present the views of the various authors and to correlate their work with the hope that it may point the way to a common cause.

Causes or exciting factors of all of the 69 cases of the allergic group are listed below as given by the different authors.

I. Psychic: Fear, anger, grief, fright, anxiety, mental shock, excitement, prolonged or arduous mental application, psychoneuroses or neurotic persons of families.

II. Thermic: Exposure to cold, sudden changes from warm to cold surroundings or vice versa.

III. Mechanical: Exhaustion or great fatigue, slight traumatisms, riding on bicycle, train or horseback.

IV. Chemical:

A. Hypersensitiveness to foods:
Spiced fish, fresh pork, fresh or canned fish, oyster stew, pork and lard, oats, tea, cheese, milk, grapes and beer, strawberries, excessive salt, scallops and Camembert cheese, walnuts and chocolate, animal and vegetable albumen, farinaceous foods, zwieback, macaroni, bread, eggs, tomatoes, sea fish, honey.

B. Hypersensitiveness to infection or bacteria:
Gonococci, streptococci, staphylococcus citreus and albus, tonsillitis, ethmoidal and sphenoidal sinusitis, appendicitis, frontal and maxillary sinusitis, biliary tract infection.

C. Hypersensitiveness to drugs:
Arsenobenzol, morphine withdrawal, alcohol, withdrawal of gardenal and pilocarpine, acetylsalicylic acid, thymol and quinine.

D. Hypersensitiveness to other substances:
Rubber dental plate, timothy, flaxseed, clover and ragweed.

V. Associated with other diseases or physical deficiencies: Migraine, rheumatism, urticaria, asthma, hay fever, edematous purpura and eczema, constipation, onanism, atypical adiposis dolorosa, metabolic disturbances, depletion of thyroid hormone, disharmony or dysfunction of the ductless glands, toxic elements found in the gastro-intestinal tract, toxins of arthritis or purpura.

With as varied a list of etiologic factors as has been noted above, can any one term be used which will be all-inclusive? If one cause alone can be held responsible for those of the allergic class of cases, can it also be attributed as the

cause of the hereditary form? Perhaps the most conclusive way to answer these questions will be the citation of the views of some of the writers on the subject.

Osler does not place too sharp a line of demarcation between urticaria and angioneurotic edema. Menagh has classed the two conditions together in his search for their cause. McKenzie points out that the crisé hemoclasique described by Widal and his associates is an interesting accompaniment of urticaria and later adds, "What has been said in the section on urticaria concerning the role of allergy in the etiology of that condition applies equally well to angioneurotic edema." In speaking of the causative agent in a paper on angioneurotic edema, Joltrain, Morat, and Ley Jacques bring forth the fact that Widal, Abrami, and Gennes have shown that, for the production of urticaria, what is known as a colloidoclastic diathesis is necessary which is dependent upon two factors: (1) disequilibrium of the neurotonic system, and (2) dysfunctioning of the endocrine glands. While discussing the cause of hay fever, asthma, nasal hydrorrhea and urticaria, Williams remarks that the present consensus of opinion seems to be crystallizing into the belief that underlying most cases is an anaphylaxis. He continues, "Selfridge, Gottlieb, Miller, Baetjer, Lermoyez and Shea all make reference to the allergic or anaphylactic origin of one or more of these vasomotor disturbances. There seems to be a growing tendency to connect these vasomotor neuroses with a disharmony or dysfunction of the ductless glands." In this matter Austrian says that, inasmuch as there is a familial tendency to dysfunction of these glands, as well as to the development of angioneurotic edema, it would be interesting to study cases of the latter for evidence of endocrine disease. There is a class of cases in which typical symptoms are brought about by exposure to cold. Lermoyez explains these cases as manifestations of hemoclastic shock. Pagniez and Pasteur Valley express the view also that the cause of angioneurotic edema is anaphylaxis, "which Widal and his students call a hemoclastic crisis that precedes the skin crisis." Anaphylaxis, according to Ravogli, plays a leading role in the etiology, and Menninger has found that most recent work shows the disease to be a manifestation of congenital or acquired hypersensitiveness to foreign protein.

The views of Crowder and Crowder are expressed as follows: "A point that seems not to have been considered sufficiently heretofore is that of specific or non-specific protein sensitization after the manner of anaphylaxis. The history of idiosyncrasies in certain families, such as the tendency to hay fever and asthma, or the susceptibility to certain foods, has long been known. Similarly, a high degree of spontaneous sensitization to foreign proteins, specific or non-specific in character, and often multiple, with a distinct tendency for it to occur in families in which there is much evidence of inherited sensitization being transmitted as a dominant characteristic according to the Mendelian Law, has been recently pointed out by Longcope. Herein may lie the explanation of angioneurotic edema. It offers the most fertile visible field for future investigation. If inheritance is a factor, it can not be simply by means of passive transfer from mother to offspring, but in some instances at least would seem to be a true inheritance of cell characteristics derived from one of the parents. In the important work published by Cooke and Vander Veer they have shown from a clinical study of the family history of 621 patients suffering from evidences of protein sensitization, chiefly hay fever, that sensitization affects members of families in proportions which closely approximate the theoretical figures of the Mendelian Law. They believe that the inheritance consists in the transmission of a tendency to sensitization only, and not to the sensitizing substance itself. They look upon angioneurotic edema as a true anaphylactic reaction."

Prevalent opinions as expressed by Phillips are that either a congenital hypersensitivity or allergy, or else a tendency to become artificially sensitized to a foreign protein (anaphylaxis), is probably an inherited characteristic of the cytoplasm. Although human sensitization is believed to be non-specific in character, "Angioneurotic edema, curiously enough, is often transmitted as a specific condition."

"There are many questions," continues Phillips, "regarding the inheritance of angioneurotic edema that are not clear. One is the sudden appearance out of an untainted ancestry of an individual afflicted with the disease. Some of these, but not all, transmit the condition to their offspring. The inheritance of familial angio-neurotic edema is almost in an unbroken line in

figures closely approximating in mathematical exactness to those expected from a dominant, while that of sporadic cases is likely to alternate with other manifestations of hypersensitiveness. Another feature is the occasional skip of one or more generations in the line of inheritance, although these breaks may be partially explained by some individuals showing symptoms late in life and in some cases by those who may be apparently healthy, but give positive cutaneous reactions to two or more foreign proteins, also by those who may be born hypersensitive but because of environment never come in contact with their exciting allergen and hence do not display clinical symptoms."

Concerning the distinction between anaphylaxis and allergy the former, according to Hiss and Zinsser, is the broader term and includes the allergie of von Pirquet. Their text also maintains that anaphylaxis is directly transmissible by inheritance.

These views might possibly be considered to indicate that the cause of both the allergic and hereditary forms of angioneurotic edema may be attributed to anaphylaxis. Such anaphylaxis may be either congenital or acquired, preceded by or concomitant with a crisé hemoclasique, which, in turn, is dependent upon disequilibrium of the neurotonic system and dysfunction of the endocrine glands. This crisis appears fundamental in the development of angioneurotic edema.

PATHOLOGY

For some time during the earlier history of the disease, opportunity for study of its pathology was lacking. In later years the true pathology has been pointed out by experimental work, biopsy, necropsy and laparotomies in those cases with concurrent abdominal findings. Fox, 1902, first described wheals in the stomach of a cat, dog and rabbit. Griffith, in 1902, Morris, 1904, and Harbitz, 1911, described the pathologic anatomy. Laparotomies by Sutherland, Burrows and McRae added information on the subject. For this phase of the question reports on a case which died of edema of the glottis, those concerning the gastric mucosa and one laparotomy will be included.

Only one reference could be found offering a description of the pathology of the skin lesions themselves. Such superficial edema is characterized as a severe urticaria with exudation of serum, leukocytes and occasionally red blood cells into the interstitial tissues.

In the necropsy communications of Wason the records are as follows: "There was an extreme edema of the epiglottis, aryepiglottic folds, cuneiform and corniculate tubercles so that their outlines were obliterated. Only two large swollen translucent vertical lips were seen which completely approximated each other except for a tiny diamond-shaped orifice not more than one mm. in its greater diameter. The lungs were voluminous and purple. They had a somewhat doughy, homogeneous consistency and pressure on either lung caused pink, frothy fluid to exude into the trachea. Occasional pin-point hemorrhages were seen over the pleural surface.

"Microscopically . . . in the pharynx the picture was also mainly one of edema involving mucosa, muscle tissue and deeper sub-muscular tissue. The blood vessels and lymphatics were moderately dilated. The cells here were chiefly of the small mononuclear type, although a few polymorphonuclears and large mononuclears mingled with them.

"The condition described above is that of an extreme edema of the respiratory tract with a mild and variable type of cellular reaction. In some sections of the lungs and pharynx the picture is not unlike that sometimes seen following protein sensitization, a predominance of mononuclear cells."

This statement, in view of the fact that protein sensitization is an anaphylactic phenomenon, may be said to lend confirmation to the views expressed regarding etiology. The following description of the microscopic examination of the stomach mucosa, since it agrees with these details of pathology, may be considered further indirect proof.

Very frequently abdominal symptoms are encountered in the disease. On the gross findings discovered by laparotomy, Harrington may be quoted as saying, "There was a good amount of clear, free fluid among the intestines, and filling up the pelvis. The intestines themselves were engorged with blood, and so red that a mild peritonitis was at first suggested. There were no hemorrhagic areas in the intestinal walls, but at a point within a short distance of the ileocecal valve a cylindrical enlargement of the ileum two and one half inches long was brought to light

which entirely surrounded the gut, increasing the bowel circumference to twice its ordinary size. The swelling was evidently in the bowel wall, elastic to touch and did not pit on pressure. It can be easily understood how such an infiltration could derange peristaltic action of the intestine. The enlargement of the intestines and the free fluid were explained by the violent peristalsis brought on in the effort to force down the lesion, which was actually in the intestinal wall."

During an attack of the edema, which was accompanied by marked colicky pains and vomiting, in an effort to relieve these symptoms, gastric lavage was attempted, which resulted in the accidental removal of a piece of tissue with the stomach tube. Morris, who described the case, made the following report: "Microscopically the tissue proved to be the gastric mucosa, most probably from the pyloric end, the character of the sections corresponding in general to that of the glands from the pyloric end of the human stomach. The entire tissue presented the picture of an extreme edema of the interstitial tissue, the lymph spaces and vessels being enormously dilated, the cells of the stroma being separated by wide spaces or vacuoles and the supporting fibers in many places separated into their ultimate fibrillæ. The edema, however, was chiefly confined to the interstitial tissue, hence the suspicion of the tissue having been water-soaked was not supported. The appearance of the vacuole in the stroma and the dilation of the lymphatics gave, moreover, the impression of a fluid confined under pressure. Numerous small round cells were present in many areas to a greater extent than is found in normal gastric mucosa. From all the appearances a diagnosis of 'extreme edema of the gastric mucosa, non-inflammatory in origin' was given."

CASE REPORT

The following case history is given as an example of the allergic type of angioneurotic edema because no other case has been found to have resulted from phenobarbital (luminal). Points which seem to substantiate the diagnosis are: (1) the very nature of the lesions; (2) their distribution over the usual sites of predilection; (3) the periodicity; (4) the good health of the patient except as noted; (5) the milder exacerbations of the angioneurotic edema on subsequent experimental repetition of smaller doses of luminal; (6) the clinical course. Menninger defines the usual rash from phenobarbital as maculo-papular (scarlatinaform) or urticarial. He cites cases of these rashes which appeared on three patients out of a total of 400 to whom luminal was administered.

Mrs. W. A., Jr., 33, white.

At noon on July 30, 1928, the patient first presented herself at the office complaining of a rash, burning, itching, swelling and redness. She first noticed the eruption on the inner aspect of the right thigh at five o'clock the same morning. At that time she applied Vick's Vapo-rub and the lesion disappeared. Before subsiding, it involved an area three inches in diameter, was raised three or four millimeters above the level of the surrounding skin, and had a pink border with a pale, white center.

About an hour after its first appearance, the rash again was noticed beginning with burning and itching over the back of the neck. Of the same nature as the initial lesion on the thigh, the second outbreak gradually spread to involve the entire back of the neck and the greater portion of the scalp. She described the sensation provoked by saying that her neck and scalp felt as though they "were full of pimples." Gradually over a two hour period the swelling spread down the back and over the arms and hands, the right wrist becoming quite swollen.

By noon she was so uncomfortable that she sought relief from a physician, who gave five minims of 1 to 1,000 adrenalin chloride, waited fifteen minutes and repeated the medication. Within thirty minutes the rash and its attendant burning had disappeared. However, at about five o'clock in the afternoon, her troubles began again with pink, raised, itching and burning areas developing over the arms, legs, feet, trunk and posterior portions of both cheeks. Gradually the swellings became larger and more uncomfortable until at eight o'clock she resorted to a repetition of adrenalin, which was followed by ephedrine capsules.

She then went to bed and rested well until three o'clock in the morning (July 31, 1928), when she was awakened by a "tight feeling" and swelling of the arms, wrists, hands, feet, ankles, and lower portions of both legs. She took a second ephedrine capsule, which, within an hour, relieved the tense feeling and burning. Five hours later all her symptoms reappeared and again the adrenalin was repeated. At the onset of these lesions, cramps in both wrists and ankles, including the flexors of fingers and wrists, toes and ankles, first began. Hot packs and massage relieved the cramps in forty minutes.

On the morning of the third day, the soles of the feet itched slightly, and the feet were swollen. Adrenalin was again given by hypodermic injection and the ephedrine capsules discontinued. Her progress was satisfactory and uneventful until the same evening, when she suddenly developed a "tight feeling" and swelling in the throat. The pharynx was painted with adrenalin. Cold packs to the neck and a gargle were advised, and her symptoms abated.

In the late afternoon of the fourth day she again developed cramps and swelling of the wrists, hands, ankles and feet, marked edema of the upper lip, a sense of constriction about the chest, dyspnea, swelling of the genitalia and a sensation of "floating away." This exacerbation lasted two hours and twenty minutes, after which time she was taken to a hospital.

Her progress at the hospital was uneventful except for occasional recurrences of the swellings for ten days. While confined to bed she was taken off all food for 24 hours, and her diet was then built up by adding one new food for each twenty-four hour period. This course was pursued until she was on a general diet without the revelation of any food idiosyncrasy.

On the night before the rash first appeared she had taken five grains of aspirin and one and a half grains of luminal for a headache. She had never taken luminal before. During her stay in the hospital, smaller doses of luminal were given twice and this process repeated once upon her return home. After each administration, within twelve hours, the symptoms all returned, but in a much milder degree.

Physical examination revealed, in addition to the findings mentioned above, a sluggishness of the pupillary reaction to light, slightly enlarged cervical and inguinal glands, hyperemic and cryptic tonsils, tenderness to deep pressure in the lower left abdominal quadrant and dermographism. Her blood pressure was below normal during the second day of illness. Temperature reached 99.2 degrees F. and 99.0 degrees F. twice while in the hospital.

Laboratory tests showed a negative urinalysis throughout with the exception of a faint trace of albumin on two separate occasions. Leukocyte count was 10,400 on the second day at the hospital. Red blood count and hemoglobin were normal. Wassermann test was reported as hemolyzed, and it was not repeated. Basal metabolism was found to be plus 15. No hereditary features were discoverable in the family history. Past history revealed nothing that had any bearing on the present illness.

BIBLIOGRAPHY

Bannister, H. M.: Acute angioneurotic edema. Jour. Nerv. and Ment. Dis., 1894, No. 21.

Barber, H. W.: Chronic urticaria and angioneurotic edema due to bacterial sensitization. Guy's Hosp. Rep. 1923, 73:1.

Bullock, W.: Treasury of human inheritance. 1909, Part III, 38.

Burke, E.: A case of angioncurotic edema. Indian Med. (Feb.), 1927, 62:83.

Cameron, D. C.: Family history in a case of angioneurotic edema. Lancet, 1920, 2:849.

Crowder, J. R., and Crowder, T. R.: Five generations of angioneurotic edema. Arch. Int. Med., 1917, 20:840.

Dryland, G. W.: Angioneurotic edema treated by thyroid extract. Med. Press. (Aug. 8), 1917, 101.

Erickson, W. J.: Angioneurotic edema. Jour. Am. Med. Assn., 1921, 77:858.

Florsheim, S.: Giant urticaria due to diseased tonsils. Calif. and West. Med. (Dec.), 1926, 25:752.

Harrington, F. B.: Angioneurotic edema, report of case. Boston Med. and Surg. Jour., 1905, 152:362.

Hiss, P. H., Jr., and Zinsser, H.: Textbook of bacteriology, 4th Ed., 1918, 302.

Joltrain, E., Morat, D., and Ley, Jacques: Giant urticaria. La Presse Med. (Nov. 9), 1927, 25:1361.

Laudon: A peculiar skin disease. Ber. Klin. Wchnschr. (Jan. 12), 1880, 17:23.

Lovett, R. H.: Acute circumscribed edema. Bost. Med. and Surg. Jour., 1890, 123:409.

McKenzie, G. M.: Bedside diagnosis (Blumer), 1928, 1:556.

Menagh, F. R.: The etiology and results of treatment in angioneurotic edema and urticaria. Jour. Am. Med. Assn., 1928, 90:668.

Menninger, W. C.: Skin eruptions with phenobarbital (luminal). Jour. Am. Med. Assn. (July 7), 1928, 91:14.

Menninger, W. C.: The treatment of angioneurotic edema. Jour. Am. Med. Assn., 1926 (Feb), 23, 68.

Milton, J. L.: On giant urticaria. Edin. Med. Jour. (Dec.), 1776.

Morris, R. S.: Angioneurotic edema. Am. Jour. Med. Sci., 1904, 812.

Ormsby, O. S.: Diseases of the skin, 1921, 153.

Osler, Sir Wm.: Hereditary angioneurotic edema. Am. Jour. Med. Sci., New Series, 188, 95:362.

Osler, Sir Wm.: Principles and practice of medicine. 1920, 1115.

Osler, Sir Wm.: Visceral lesions of the erythema group, Brit. Jour. Derm. (July), 1900, 227.

Pagniez et Pasteur Valley, Radot: Etude Physiopathologique et Therapeutique, d'un cas d'urticaire geante. a Presse Med., 20, 1920 (Nov. 16). 529-532.

Phillips, J. McI.: Angioneurotic edema. Jour. Am. Med. Assn. 1922, 78:497.

Ravogli, A.: On the so-called angioneurotic eruptions. Ohio State Med. Jour. (Dec.), 1922, 18:839.

Schorer, G.: Angioneurotic edema with unusual accompanying symptoms. Schwerische Med. Wchnschr. (Apr. 16), 1925, 55:340.

Sequeira, J. H.: Diseases of the skin, 1915, 370.

Stern, G., Hypersensitivity to rubber as a cause of urticaria and Quincke's edema. Klin. Wchnschr. (June 4), 1927, 6:1096.

Strouse, S.: Angioneurotic edema and urticaria. Med. Clin. No. Am., 1920, 3:1589.

Sutton R. S.: Diseases of the skin, 1926, 147.

T. F.: The treatment of angioneurotic edema. Lancet 1916, 2:658 (correspondence).

Turcttmi, G.: Quincke's disease from late sensitization to bread and other farinaceous foods. Bull. et men. Soc. Med. f. hop de Par. (May 19), 1922, 46:811.

Turnbull, F. M.: Etiologic factor in angioneurotic edema. Jour. Am. Med. Assn. 1921, 77:858.

Wason, I. M.: Angioneurotic edema. Jour. Am. Med. Assn. (May 1), 1926, 86:1332.

Williams, C. B.: Asthma, hay-fever, nasal hydrorrhea and angioneurotic edema. Laryngoscope, 1923, 33:31.

THE VALUE OF CONSERVATIVE OPERATIONS IN IRREMOVABLE LESIONS OF THE STOMACH*

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THE treatment of chronic gastric ulcer may be properly assumed to be surgical. The variability in the size of the ulcer, the site and the complications are such as to make indisputable the fact that the most effective surgical procedures must be varied correspondingly. Whatever the surgical procedure, however, there are many reasons why the treatment should include, if feasible, the removal of the lesion. The methods by which such removal is accomplished again vary according to the age and condition of the patient, the size, situation, and complications associated with the ulcer, and the experience of the surgeon.

It is not my purpose here to deal with the cases of gastric ulcer in which the lesion is removable, but to discuss cases in which the ulcer is so situated that removal, although technically possible, would not be, at least at the time, in the best interests of the patient. Fortunately the latter cases are rare. It is this group of cases which I shall discuss, particularly from the standpoint of treatment and the results of treatment.

Lesions in which primary removal has not been attempted are usually situated in the fundus of the stomach, occasionally in the body, and rarely in the pyloric end. The roentgen ray provides the most accurate means of locating the lesion, and will give valuable information as to the possibility of maligancy. The ever-present question whether or not a given lesion of the stomach is malignant should never result in confusion or prolonged debate, since it is well known that there is no positive method of determining preoperatively whether the lesion is malignant. The only safe rule to follow is never to deny a patient exploration of a gastric lesion unless obvious metastasis is present. The diagnostic study of such a lesion, therefore, should not include any unwise attempt to determine its character, other than what may be obvious in the assembling and interpretation of all available information. The indications for surgical intervention in such cases, are, therefore, usually clear, and they are apparent to the patient, since the symptoms are often severe, the disability marked and well directed measures of relief have failed.

Even in cases in which pain is insignificant, it is unwise to share the responsibility of agreeing to any treatment other than surgical, unless serious lesions of the heart and so forth contraindicate operation or unless the gastric lesion is small, and medical treatment has not been tried; in such cases medical treatment may be substituted for a reasonable length of time under close supervision. With the exception of these few cases, operation should be carried out without delay and the fact that many of these lesions are associated with extensive extragastric, subacute, inflammatory products renders the patients susceptible to rest in bed, adequate fluid intake, bland diet and gastric lavage for a few days prior to operation. By such preoperative care the difficulties of operation are lessened, and the safety correspondingly enhanced.

The incision can be varied according to the site of the lesion. If the roentgenogram has shown the lesion to be in the fundus, a left rectus incision has advantages, and no disadvantages, since it is usually wise even if other lesions are found to postpone whatever treatment may be necessary until a more appropriate time. For lesions in the body of the stomach, or in the antrum, a median-line incision is adequate.

A very important rule to follow in the examination of a gastric lesion is never to decide quickly that it is irremovable. I have found repeatedly that lesions which, because of their situation and extensive fixation to liver or to pancreas, appeared to be irremovable could, by mobilizing uninvolved portions of the stomach and freeing the attachments, be converted into lesions suitable for resection, excision, excision combined with gastro-enterostomy, or a two-stage method of removal. The lesion in the body of the stomach can usually be removed, and should be removed, but occasionally the lesion itself or the extragastric involvement or both are such as to make removal at the time unwise. The question of possible malignancy in such cases can

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usually be settled by the reflection that if such lesions with wide extragastric infiltration are malignant, permanent cure is probably out of the question.

Lesions in the antrum or near the pylorus may offer the greatest difficulty in the determination of the best treatment. If the lesion is clearly on the gastric side and the inflammatory process extensive, and if the patient is in poor condition, removal may be unwise. Fortunately such cases are rare. If the inflammatory mass involves the pylorus and the periduodenal tissues, and the crater cannot be identified, there is good reason to suspect that it is on the duodenal side and removal is unnecessary.

There are four procedures in cases of gastric lesions in which it has been proved, after most careful inspection, that attempts at removal should not be made: (1) posterior gastro-enterostomy; (2) anterior gastro-enterostomy; (3) jejunostomy, and (4) partial gastric exclusion.

For irremovable lesions in the fundus, the choice lies between posterior gastro-enterostomy and jejunostomy. If the patient is advanced in years, or if the history is brief and secondary anemia is marked in the absence of gross bleeding, carcinoma is suggested; in such cases posterior gastro-enterostomy is preferable. This operation can usually be performed, since the posterior attachments are so high that an ample amount of stomach can be mobilized below the lesion to permit satisfactory anastomosis. W. J. Mayo early called attention to the fact that approximately 50 per cent of non-malignant gastric ulcers could be cured by gastro-enterostomy alone. The frequently quoted statement that gastro-enterostomy should be carried out proximal to the lesion cannot be applied in such cases. Conditions of obesity, previous operations, or a small fixed stomach may make anterior gastro-enterostomy preferable, and, to insure proper drainage, entero-anastomosis should be added. I have not found that entero-anastomosis has any disadvantages in cases of gastric ulcer, and it is a very important factor of safety. In younger patients, and when it appears probable that the lesion is benign, jejunostomy offers a good prospect for the healing of the lesion. In a number of cases I have observed complete disappearance of the lesion after a few weeks of feeding through the jejunostomy tube, without recurrence following removal of the tube. The length of time for the tube feedings will depend on roentgenologic evidence as to what changes are taking place in the lesion. If supplementary oral feedings become advisable they should be based on a strict antiulcer regimen. It is possible in some cases to reoperate on the patient after some weeks and excise the lesion, because of subsidence of the inflammatory changes in and about the lesion.

For irremovable lesions of the body of the stomach, anterior gastro-enterostomy is usually found to be the method of choice, since the lesions are almost always on the posterior wall, making a satisfactory posterior anastomosis difficult. Again in such cases, if the lesion becomes less active under the influence of the gastro-enterostomy, but is shown by roentgenologic evidence to persist and the patient's condition has sufficiently improved, secondary operation can be advised for removal of the lesion.

For irremovable lesions near the pylorus and definitely on the gastric side, partial gastric exclusion is a most useful type of operation. The stomach is divided well above the lesion, the pyloric stump closed, and the end of the upper segment brought down as a posterior or anterior end-to-side gastro-jejunostomy. The relief of symptoms in such cases is complete and, if the lesion is not malignant, is usually permanent. If the lesion is malignant, protection against subsequent disagreeable symptoms, particularly obstruction, is usually complete. Important, too, is the possibility, following such exclusion of the lesion, of lateral removal of the pyloric segment with the lesion.

The principle, therefore, of a conservative type of operation in cases of irremovable gastric lesions is an important one, and although primary radical removal can be accomplished in some cases, it would be, even in the hands of a surgeon who has had a large experience with such lesions, more of a surgical feat, with doubtful immediate or remote results, than an operation in the best interests of the patient.

CARCINOMA OF THE THIRD PORTION OF THE DUODENUM, WITH A BRIEF REVIEW OF THE LITERATURE

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JAMES EWING, in his "Neoplastic Diseases," gives perhaps the most comprehensive review of the literature on the subject of carcinoma of the small intestine in general and of the duodenum in particular. He cites the following statistics from various authors:

1. Stengel—8.5 per cent of all carcinomata originate in the intestinal tract.

2. Brill—2.5 per cent of all carcinomata of the intestinal tract arise in the small intestine.

3. Geiser—4 per cent of all intestinal carcinomata occur in the duodenum. The average age of these cases is 54 to 56 years.

Denver M. Vickers, in an article in the Annals of Surgery for February, 1925, states the following:

1. Various writers state that carcinomata of the intestines comprise from 2.5 to 9.2 per cent of all the carcinomata, excluding those of the stomach.

2. Forque and Chavin reviewed 88,031 autopsies and found that 0.5 per cent of all carcinomata occurred in the small intestine.

3. Collected statistics from eight different authors give 9.9 per cent of intestinal carcinomata as being in the small intestine and 4.5 per cent in the duodenum; 0.34% of all carcinomata arise in the duodenum.

4. McGuire and Cornish in 1920 tabulated sixty-six cases of carcinoma of the duodenum and sixty-nine of carcinoma of the jejuno-ileum from the literature. Per unit length, the jejunum was least frequently involved.

All authors, in writing on carcinoma of the duodenum, divide the latter into three divisions —the first or parapyloric or supra-ampullary, the second or peri-ampullary, and third or infra-ampullary or prejejunal. All agree that of carcinoma of the duodenum, those of the second portion are by far the most frequent, and those of the third portion the most infrequent, being one of the rarest of all tumors. Most of duodenal carcinomata arise in or about the papilla of Vater. Eusterman, Berkman and Swan (Annals of Surgery, August, 1925) reported fifteen cases of carcinoma of the duodenum from the records of The Mayo Clinic. Of these, six were in the first portion, six in the second, and three in the third. However, Ewing states that of Rolleston's forty cases, only eight were in the first portion, while twenty-four were in the second, and three in the third; and of Geiser's seventy-one cases, eleven were in the first portion, fifty-one in the second, and nine in the third.

Symptoms of carcinoma of the duodenum, once they arise, are usually progressive, and increase rapidly in severity. This is especially true of carcinoma of the second portion of the duodenum involving the papilla of Vater. Carcinoma of the first portion gives rise to symptoms closely simulating pyloric obstruction. Ewing states that most of these follow benign ulcers. Other writers state that this is rarely the case. In carcinoma of the second portion, jaundice is an early and important symptom. The Rochester report is the only one which disagrees with this. In their cases, jaundice was usually only a terminal event. However, Ewing also writes that jaundice may be absent and the gastric symptoms may be prominent. Carcinoma of the third portion may give rise to dilatation of the duodenum above the stricture, if this is present, with gastric symptoms and vomiting of considerable quantities of bile and pancreatic ferments. Several authors advise the radical removal of the tumor, usually in two stages—cholecystenterostomy and transduodenal excision of the tumor—with a few apparent cures. Others use only palliative measures — cholecystenterostomy or gastroenterostomy, depending on the location of the tumor.

The structure of the growth is usually that of a cylindrical-celled or alveolar carcinoma. Scirrhous carcinomata have also been reported.

REPORT OF CASE

This was the case of a white married female, aged 47, who first reported for examination July 5, 1927. She had been ill for about one year and dated all her

trouble to an attack of influenza with which she had been in bed one week with fever. Shortly after this she began to have spells of nausea, and later pain and soreness in the epigastrium. At first these spells would last from a few hours to a few days with periods of several days in which she had very little distress. There was no definite relation to the taking of food, except

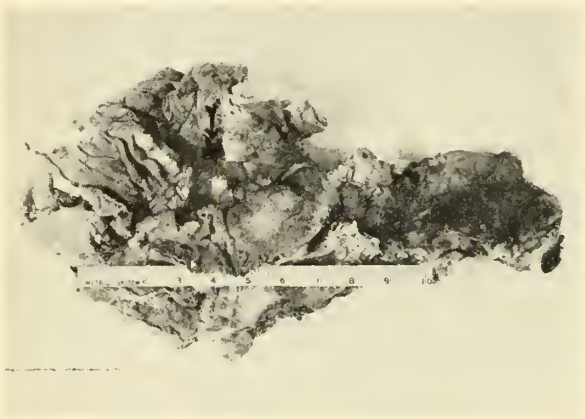

Fig. 1. Gross specimen showing the duodenum and the pancreas. The duodenum has been opened. The arrow points to the superior margin of the malignant ulcer.

that she felt better after having taken food than before, but there was some distress present constantly. Very heavy food aggravated the distress, as did also lying on her right side. Her appetite was very poor, but she had never vomited. The pain was never sharp, but sometimes cramp-like and radiated to the back. She had occasional attacks of dizziness which lasted for a few minutes at a time. There had been no black stools. Some lower abdominal distress had been noted which was more to the left side. This was worse with bowel movements. Lately the trouble had been almost constant, with only short periods in which she was free from symptoms. She was very weak and nervous and had lost about thirty-five pounds during the year of her illness.

Past History.—She had never been very healthy, and had had repeated sore throats. In 1915 her appendix and right tube had been removed. In 1921 a left pus tube and right ovarian cyst had been removed. The gallbladder was explored at this time and found to be normal. Some dyspnea on exertion had been noted. She had not menstruated for one year, except for a trace two months before.

Family History.—Both her mother and father had had died of apoplexy and there was a family tendency to nervousness.

Physical Examination.—This revealed a slender, emaciated woman with dry, scaly skin which was quite deeply pigmented (probably the result of alpine lamp treatments). The blood pressure was 100/64. The lungs and heart were normal. The liver was quite markedly enlarged. To the left of the umbilicus, a nodular mass could be palpated which was tender to pressure. Stomach peristalsis was questionably visible, and the upper abdominal muscles were somewhat rigid. Rectal and pelvic examinations were negative.

Laboratory Findings.—The hemoglobin, taken twice, was 36 and 42 per cent; red cells 2,700,000; white cells 7,850; normal differential count. One nucleated red was found, but there were no myelocytes. The mononuclear type of cells seemed rather granular.

Fig. 2. Photomicrograph of a section taken from the margin of the ulcer.

There was no evidence of a pernicious type of anemia. The blood Wassermann was negative. The urine was normal except for an occasional pus cell. The stools contained no blood by the guaiac test, and were well formed. The stomach contents showed normal acid values and no occult blood.

X-ray Examination.—The examination of the gastrointestinal tract showed a normal stomach except for a marked gastroptosis. The cap seemed normal, although a little spastic, and there was possibly a very slight filling defect on the posterior surface. The motility of the stomach seemed to be normal. The intestinal tract was normal both by barium meal and clyster, except for the visceroptosis. The mass in the abdomen appeared to be behind and above the colon, although pressure over the region caused pain. The gallbladder filled normally with the dye test, but emptied poorly and was displaced downward nearly to the pelvis by the enlarged liver. Cystoscopy, with pyelograms of the left ureter and kidney pelvis, was done and revealed nothing abnormal.

The impression at this time was that the patient had

a retroperitoneal tumor, possibly either sarcoma or carcinoma of the tail of the pancreas, or less likely lymphogranulomatosis.

She was put to bed and a bland, forced diet given her. Deep *x*-ray therapy was started two weeks after she was first seen. This was followed by nausea and vomiting and abdominal discomfort. When seen on August 8, 1927, the patient was not doing well. She was very pale, and there was evidence of increasing loss of weight. Hospitalization was advised, and she entered St. Mary's Hospital on August 10. She was placed on a régime of bed rest, bland diet, with whole milk every hour, juice from rare beefsteak and liver broth, intramuscular injections of 25 c.c. of whole blood daily for the first four days, iron citrate 10 c.c. subcutaneously, daily, ultra-violet light daily, chalk and soda bicarbonate powders every two hours, heat to the abdomen every alternate hour. Luminal and codein were required as sedatives. Deep *x*-ray therapy was repeated shortly after admission. This was followed by a gradual reduction in the size of the mass. The temperature was elevated and ran an irregular course during the first two weeks in the hospital, reaching a maximum of 102.4. She experienced some urinary frequency and difficulty in starting the urinary flow, and pus was found in the urine. During the last three weeks of her stay in the hospital, the temperature remained practically normal, and some improvement in her general condition was noted. The hemoglobin rose gradually from 29 to 45 per cent. Occult blood, which had been present in the stools at first, later was absent. She was discharged September 13, 1927, after thirty-four days in the hospital.

She continued to do well for a time at home, and the mass remained stationary in size, although definitely present. She soon began to go down hill, however, and developed great bladder distress.

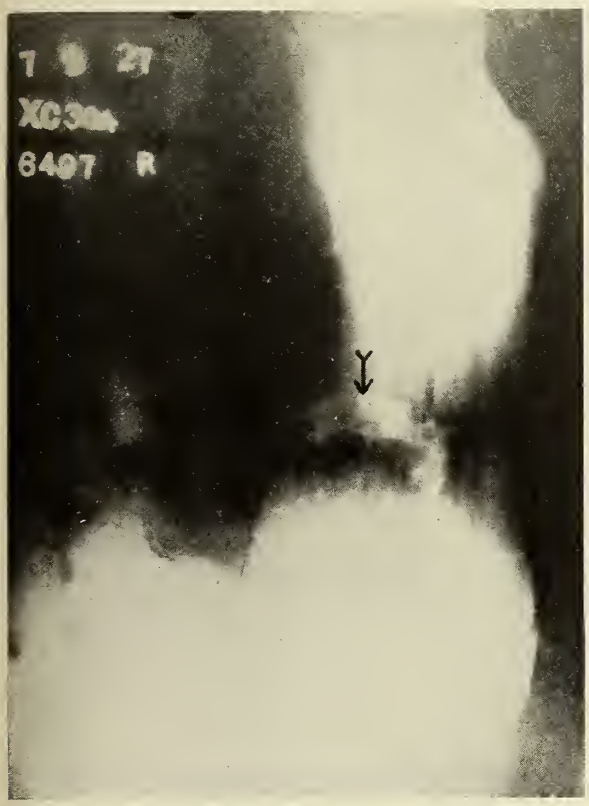

Fig. 3. X-ray of stomach showing barium in the duodeno-jejunal flexure, posterior to the stomach.

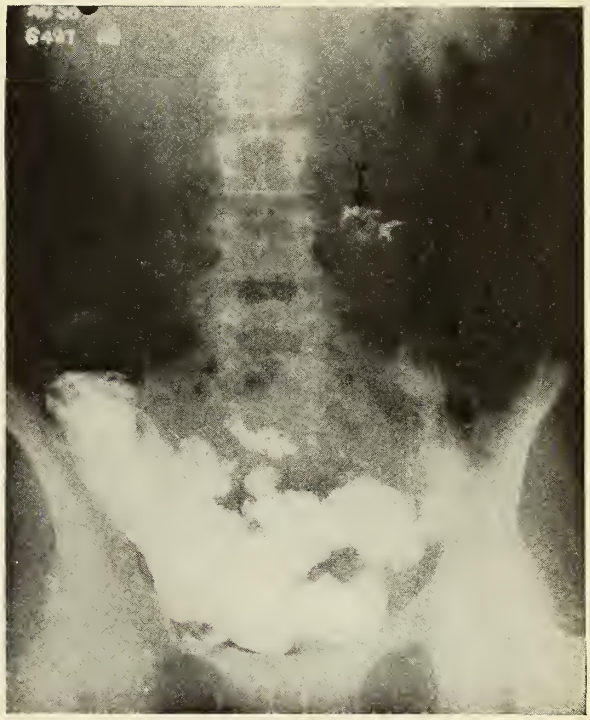

Fig. 4. X-ray taken at the end of eight hours showing stomach empty, but barium still sticking at the duodeno-jejunal flexure. (The two x-ray plates were re-examined after the autopsy. It was then concluded that the barium was sticking at the site of the malignant tumor.)

She was readmitted to the hospital October 24, 1927, with the urinary symptoms and marked tenderness over the mass in the upper left quadrant. Pus was present in the urine. The hemoglobin was 41 per cent and the white blood count was 6,800 with a normal differential. Cystoscopy with pyelograms was repeated, but showed no abnormalities. *X*-rays of the chest, lumbar spine and pelvis showed no evidence of metastatic involvement. In view of this and the fact that the mass had remained stationary in size, exploratory operation was advised, and this was done on October 29. Marked adhesions were found around the gallbladder, liver and duodenum. A mass was found in the region of the pancreas about the size of an orange. Several enlarged glands were found, but frozen sections of these showed no malignancy. The mass was then broken into bluntly, and two to three ounces of a foul smelling exudate were found. Sections from this mass showed adenocarcinoma. A large rubber drain was inserted

into the mass and a coffer dam laid between this and the liver with iodoform packs. The abdomen was then closed.

She stood the operation fairly well. On the second postoperative day there was some abdominal distention, but she gradually improved until the eleventh day when the wound showed a great deal of suppuration and digestion, apparently from pancreatic juice which was escaping. This continued and on the fourteenth day a hemorrhage of about one cupful of blood occurred. The condition of the patient became rapidly worse, and on the following day the hemorrhage was repeated. Death occurred shortly after this.

Autopsy Report.—"The peritoneal cavity shows numerous adhesions about the operative wound. There is no general peritonitis. On removing the liver a large abscess pocket is found between the left lobe of the liver, the lesser curvature of the stomach and the right side of the esophagus. It contains about 300 c.c of foul smelling pus. The liver weighs 1,100 grams. The capsule is smooth except at the site of the abscess. A number of pale yellow flecks are visible beneath the capsule. The cut surface is pale brown in color. The gallbladder and ducts are normal.

"The mucous membrane of the stomach and first portion of the duodenum is normal. In the duodenum, at the duodenojejunal junction there is a perforation about three cm. in diameter. This perforation is directed upward and to the left. About the perforation in the duodenum there is a large fungating and necrotic tumor mass. The proximal side of the perforation and the duodenum are densely adherent to the head of the pancreas. Near the perforation, in the anterior surface of the body of the pancreas, is an area of necrosis or gangrene about 1.5 cm. in diameter, which is rather superficial. There are dense adhesions between the head of the pancreas and the stomach. On the superior surface of the pancreas is another large abscess, containing foul smelling pus. No tumor is demonstrable grossly in the pancreas. No metastases found grossly anywhere. Microscopic examination shows adenocarcinoma of the bowel."

"Diagnosis: 1. Carcinoma of the duodenum. 2. Localized purulent peritonitis."

ACTION OF MORPHINE ON THE ALIMENTARY TRACT

A better understanding of the action of morphine on different parts of the alimentary canal was obtained by animal experiments which showed that the most constant and lasting effect of morphine on gastric motor activity is a decrease in the muscular tone of the stomach wall which outlasts the decrease in amplitude and frequency of peristaltic waves. Diacetylmorphine, codeine, papaverine and nicotine produce similar effects. In the colon the pronounced effect is a marked increase in tone, accompanied by more continuous peristaltic activity. On the basis of these experiments the constipating action of opium may be ascribed to the following: Relaxation of the stomach wall and decrease in peristalsis of the pyloric antrum decrease the rate of discharge of gastric contents into the duodenum. Consequently the stomach contents are distributed in small quantities throughout the small intestine, and this would lead to more complete digestion and absorption. The increase in tone and peristaltic activity of the small intestine would produce more even distribution of the content and further increase absorption. In the colon, the marked increase in tone serves to hold back the material from the sigmoid and rectum, facilitates absorption, and renders the residue drier. These factors seem to explain the constipating action of opium. The antidiarrheic action of the opium alkaloids may be explained by the increase in tone of the small and large intestine. The increase in tone of the musculature of both the small and the large intestine, following the administration of the opium alkaloids, will cause more even distribution of the content and lessen the tendency to distension, thus removing one factor in the production of pain. (Jour. A. M. A., April 13, 1929, p. 1269.)

HYPERVITAMINOSIS

From data relating to the therapeutic potency of irradiated ergosterol in protecting experimental animals against rickets on an otherwise rachitic diet, it has been estimated that one part in many millions of food suffices to secure the prophylactic purpose. In human infants a daily dosage of considerably less than 4 mg. (6/100 grain) has already been demonstrated to be curative in cases of unmistakable rickets; and there is little doubt that this quantity may be considerably larger than the minimal protective dose. It should not be surprising if larger quantities of such potent substances would exert a pronounced effect on the organism, in directions that may not always be merely beneficial. There have been reports of experiments indicating the possibility of inducing hypercalcemia through use of large doses of irradiated ergosterol. There is no longer any doubt that harm may result from extremely excessive doses of irradiated ergosterol in rachitic animals. The hypervitaminosis to which reference has been made in experiments has involved the use of truly enormous doses. There are no evidences of harm, but many indications of striking benefit, from the customary intake of fat-soluble or other vitamins. Toxic effects at such enormous dosages should not in any way discourage the rational use of the properly standardized materials. For the benefit of those who wish to be on their guard for evidences of effects beyond the desired benefit, it may be stated that hypercalcification (eburnation), abnormally high blood pressure and hypercalcemia need to be borne in mind. (Jour. A. M. A., April 13, 1929, p. 1270.)

THE PREVENTION OF HEART DISEASE*

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THE greatest individual cause of death in the United States today is heart disease. Other diseases have shown decreased morbidity over a period of years; heart disease has shown a steady increase. The fact is a direct challenge to the medical profession and can no longer be ignored.

That the necessity for serious, active effort regarding the problem of heart disease is genuine is seen in the organization of a national movement in 1922, when the American Heart Association came into being. This large organization is composed of leaders in American medicine, resident in most of the states in the Union, who are working with a common purpose to investigate in detail the various phases of heart disease as it pertains to preventive medicine. The suborganization according to states has been variable. In some localities independent groups have been originated; in other places association has been effected with the groups studying tuberculosis or with other bodies interested in health.

Minnesota made no concerted effort along these lines until about two years ago when the House of Delegates of the Minnesota State Medical Association empowered the president to appoint a committee, designated as the Heart Committee of the Minnesota State Medical Association, to investigate the ways and means of approaching the problem of heart disease in this state. This committee at the present time is undertaking a study of these problems and it is hoped that, with the coöperation of the medical profession, constructive progress will be possible.

Any one who gives thought to the question of preventive medicine in its relation to heart disease, is at once confronted with the magnitude of the problems and their multitudinous interrelationships. Unlike tuberculosis, in which a known specific etiologic factor is at work, heart disease occurs in numerous forms and in some instances the etiology is unknown. The cause is definitely an infectious agent in rheumatic and in syphilitic heart disease, whereas considerable uncertainty still shrouds the factors underlying coronary and hypertensive disease.

These facts show the necessity of concerted effort in the collection of accurate vital statistics relative to heart disease based on an etiologic classification. The value of the mass of statistics available today is limited owing to the fact that type differentiation has not been accurately tabulated. This criticism applies particularly in diseases of the myocardium, in which the profession has rested content to offer the diagnosis of chronic myocarditis. In the analysis of such cases on the basis of modern knowledge, it is found that various etiologic factors enter into the production of disease of the myocardium: namely, hypertension, coronary disease, hyperthyroidism, and at times extraneous conditions causing cardiac hypertrophy and finally cardiac failure. In its strict sense, the term chronic myocarditis denotes an inflammatory or infectious process involving the myocardium, a condition that arises from the invasion of microöganisms or of their toxins. The pathologists have demonstrated to us the relative infrequency of this condition, which clearly shows that a serious error has been made in continuing to advance this diagnosis in the routine of diagnostic work.

It is evident that the significance of injury to the heart muscle must, to quite an extent, be parallel with the significance of the underlying causative disturbance. Therefore, in order to be in possession of data sufficiently accurate to form the basis of a scientific investigation directed against these diseases, it is necessary that a classification be adopted that will permit all physicians to be better equipped to identify and classify their cardiac cases, especially on the basis of etiology.

In the attempt to secure more accurate data, the necessity of obtaining necropsy examinations becomes obvious. The general trend in the attitude toward necropsies during the last few years has been encouraging and greater effort on the part of the profession will result in an increased number of permissions to conduct necropsy. The laity is extremely interested, and

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justly so, in the various health problems and is desirous of knowing exactly the factors instrumental in the process of death, especially when something may be disclosed which is pertinent to the health of surviving members of the family.

The American Heart Association has adopted the following classification of heart disease:

A. *Etiologic*
1. Unknown
2. Rheumatic fever*
   a. polyarthritis
   b. chorea
   c. growing pains
   d. tonsillitis
   e. pharyngitis
   f. others, as purpura, erythema nodosum, and so forth
3. Syphilis*
4. Bacterial infection*
   Specify bacterium if possible
   Here should be placed subacute bacterial endocarditis (*Streptococcus viridans*), chronic endocarditis, and so forth
5. Thyroid*
   a. hyperthyroidism
   b. hypothyroidism
6. Toxic
   a. bacterial toxin
   b. mineral
   c. vegetable
   Specify if possible
7. Neurosis (cardiac)
8. General systemic disease
   Specify the disease; for example, arteriosclerosis, chronic nephritis, diabetes mellitus, emphysema, hypertension, anemia, and so forth
9. Trauma
10. Congenital developmental defect

B. *Anatomic*
1. Undiagnosed
2. Atrophy of heart
3. Enlargement of heart
4. Hypertrophy of heart
5. Dilatation of heart
6. Ventricular preponderance
   a. right
   b. left
7. Auricular hypertrophy
8. Cardiac thrombosis
9. Cardiac infarction
10. Rupture of heart
11. Myocarditis—acute
12. Myocarditis—chronic
13. Fatty infiltration
14. Fatty degeneration
15. Endocarditis
    a. acute
    b. chronic
    Include the continuous activity of valvulitis, or papillary muscle, chorda tendineæ and neural infection (usually 15 would always precede the 16 diagnosis)
16. Cardiac valvular disease
    a. aortic insufficiency
    b. aortic stenosis
    c. mitral insufficiency
    d. mitral stenosis
    e. pulmonic insufficiency
    f. pulmonic stenosis
    g. tricuspid insufficiency
    h. tricuspid stenosis should be thought of as active or inactive as expressed under etiology
17. Congenital abnormality
    Specify lesion if possible
18. Pericarditis, acute
    a. serous
    b. serofibrinous
    c. purulent
19. Hydropericardium
20. Hemopericardium
21. Pneumopericardium
22. Adherent pericardium
23. Aortitis
    a. without dilatation
    b. with dilatation
    aortitis (syphilis) in contradistinction to 28, which includes arteriosclerotic changes in the aorta
24. Tumor of
    Specify part affected
25. Aneurysm of
    Specify affected vessel
26. Embolism of
    Specify affected vessel
27. Thrombosis of
    Specify affected vessel
28. Arteriosclerosis of
    Specify locality, as coronary arteries, cerebral arteries, and so forth

*Note whether the condition is active or inactive.

29. Arteritis of (except aorta)
    Specify locality
30. Periarteritis of
    Specify locality
31. No circulatory disease
32. No cardiac disease

C. *Physiologic*

1. Regular sinus rhythm
2. Ectopic rhythms (without tachycardia)
   This is to be differentiated from ectopic rhythm with tachycardia of the paroxysmal type. In the ectopic rhythms without tachycardia, it is usually believed that the new rhythm has developed because of a depression on the normal pacemaker.
   Example: Under this heading should be classified such a rhythm as nodal rhythm
3. Vagal arrhythmia
   a. sinus arrhythmia
   b. sino-auricular standstill
   c. simple bradycardia
   d. ventricular escape
   e. wandering pacemaker
4. Sinus tachycardia (not paroxysmal)
5. Premature contractions
   a. auricular
   b. junctional
   c. ventricular
      Ventricular tachycardia (not paroxysmal)
      Those which have been reported showing this arrhythmia associated with digitalis poisoning should be classified here
   d. unknown
6. Paroxysmal tachycardia
   a. auricular
   b. junctional
   c. ventricular
   d. unknown
7. Auricular flutter
   a. paroxysmal
   b. chronic
8. Auricular fibrillation
   a. paroxysmal
   b. chronic
9. Ventricular fibrillation
10. Auriculoventricular heart-block
    a. partial block
       (1) prolonged conduction time
       (2) occasional dropped beats (irregular)
       (3) high-grade block (2:1, 3:1, and so forth)
    b. complete block
11. Intraventricular block
    a. partial
    b. bundle-branch—right or left
12. Pulsus alternans
13. Valvular incompetency
    a. mitral insufficiency
    b. tricuspid insufficiency
    c. pulmonic insufficiency
    d. aortic insufficiency
14. Hypertension
15. Congestive heart failure
16. Effort syndrome
17. Anginal syndrome

D. *Functional capacity*

1. Patients with organic heart disease, able to carry on ordinary physical activity without discomfort
2. Patients with organic heart disease, unable to carry on ordinary physical activity without discomfort
   a. activity slightly limited
   b. activity greatly limited
3. Patients with organic heart disease and with symptoms or signs of heart failure when at rest, unable to carry on any physical activity without discomfort

E. *Patients with abnormal signs, or symptoms*

Not believed to be due to organic heart disease. This diagnosis to be possible heart disease, Class E

F. *Potential disease*

Patients without circulatory disease whom it is advisable to follow because of the presence or history of an etiologic factor which might cause disease. This diagnosis to be potential heart disease, Class F.

Examples:

Heart disease: *a* Active syphilis; *b* Aortitis with dilatation, aneurysm of the ascending aorta; *c* Regular sinus rhythm; *d* Class 2a

Heart disease: *a* Inactive rheumatic fever (chorea); *b* valvular disease, mitral insufficiency and mitral stenosis; *c* Auricular fibrillation; *d* Class 2b.

This classification was adopted after much

study and thought, and, although not without faults, is a distinct step forward and gives the basis for very accurate comprehensive study.

In viewing the problem of heart disease from its various angles, certain facts stand out clearly, especially from the standpoint of prevention. Preventive measures of course are not applicable to the person already afflicted with heart disease, but from every case much information may be elicited that may be utilized in our attack on the disease in the future. The future attack, by means of prevention, is concerned chiefly with the children of this and of the coming generations.

The problem of heart disease in childhood is chiefly one of infection. Knowledge is now at hand regarding the relationship to carditis of rheumatic fever, chorea, and other infections. The arbitrary name that some time in medical history was affixed to rheumatic fever was probably one of the greatest detriments to its better understanding. Unquestionably in many cases of this disease the joints are not the part involved and the condition therefore is not recognized. It has now been shown that the disease is almost limitless in its involvement, attacking the heart, joints, lungs and other parenchymatous viscera, the pleura, skin, veins, arteries, voluntary muscle, involuntary muscle, and the central and peripheral nervous system. The disease is clearly infectious in origin, is definitely communicable, and although the causative organism is still somewhat debatable, it is a disease that justifies isolation of the patients who have it. The occurrence of several cases in the same family and occurrence of small, local epidemics are evidences of its communicability. Involvement of the heart invariably occurs with the first attack.

The relationship of foci of infection to rheumatic fever is still debatable, owing in part again to the unreliablity of available statistics. Numerous instances of recurrent rheumatic fever have been observed after tonsillectomy and the initial attack has been known to occur after tonsillectomy, yet this does not justify the conclusion that eradication of foci is not without scientific merit. Statistics on the relation of tonsillectomy to the occurrence or recurrence of rheumatic fever must be questioned as the patients have been operated on by various surgeons and the matter of thoroughness of removal must be taken into account. The trend of modern bacteriologic thought makes one reluctant to minimize the value of eradicating obvious foci of infection.

There is still considerable uncertainty about the relationship to carditis, of the other infectious communicable diseases of childhood. Involvement of the heart does at times occur, however. This suggests the thought, which later may be verified, that these communicable diseases are in reality closely related to the disorder now known as rheumatic fever.

It becomes necessary, therefore, for the physician to guard these little patients more closely during these acute illnesses. Careful and repeated examinations during the convalescent period are necessary, and in most cases the period of recovery should not be hastened. Although the health authorities have seen fit to isolate children with the common communicable diseases of this period of life, the parents, and often the physician, have considered the illness as trifling and have been lax in allowing other children to become exposed to the same disease with perhaps irreparable consequences.

The prevention of cardiovascular syphilis is of course inseparable from the problem of prevention of syphilis. Active steps regarding venereal disease have been undertaken by public health workers through educational programs and through legislation; yet many phases of the problem as it applies to heart disease remain unanswered. Adequate treatment of early syphilis and subsequent systematic observation of these patients constitute the secondary line of defense. Intensive administration of antisyphilitic drugs when cardiovascular injury is appreciable is invariably disappointing.

The problems of prevention as they pertain to coronary and hypertensive heart disease merit continued investigation and deliberation. The specific etiologic factor or factors underlying these diseases are still in question. However, clinical experience has furnished clues which must form the basis for continued study, with the ideal in mind of obtaining accurate data regarding them.

There is considerable reliable evidence that the total incidence of coronary and hypertensive heart disease is on the increase. These two forms of heart disease are well considered together owing to the frequency with which they coexist in the same patient. This evident actual increase in incidence at once raises the question as to the

influence of modern life as a possible etiologic factor. There is little doubt but that the stress and strain of life today causes an unfavorable reaction in many persons. Never before in the history of mankind has the pace of the industrial, business, professional and even of social life been so rapid. Added to this strain of current life are the residual influences of the World War, the pandemics of influenza and the rather extensive financial crises as they have influenced the present generation. Even though these influences of present-day life lack scientific confirmation as definite etiologic factors, it certainly is advisable to encourage the masses to cultivate the art of relaxation and to attempt to educate them into a safe and sane manner of living.

The influence of improper diet is also a theoretical consideration in this condition. The average American is largely carnivorous; this is in part a penalty imposed by national prosperity. The mass of Europeans and Orientals exist on a relatively low meat diet owing largely to the economic situations surrounding them. Reasonable restriction of animal proteins as persons approach middle life, especially when their occupations are sedentary, may ultimately be shown to have a definite bearing on such diseases as arteriosclerosis, hypertension, and so forth.

The tendency to cardiovascular-renal disease in some families brings forth the question of heredity. This problem has been the seat of controversy for many years, and many rather dogmatic opinions have been expressed, acknowledging or denying the influence of heredity in diseases of the circulatory system. However, when the arguments are challenged it is surprising to find how few reliable data form the basis of controversy. It is not unscientific to believe that circulatory organs of poor quality may be evolved in families in which the tendency to cardiac and arterial disease exists. That the disease is inherited cannot be believed, but it is possible to believe that persons in such families may enter life inadequately endowed to meet its struggles the strain of which largely is borne by the cardiovascular system. More proof obtainable only through medical coöperation is required regarding this problem.

Any implications that may be derived from these remarks may find a place in the instruction and counsel imparted to well patients. It is possible that the introduction of a common sense regimen or that the modification of an improper diet at the proper time may be the determining factors in averting ultimately serious consequences.

The problem of heart disease must also be viewed from an economic standpoint. Haven Emerson** has submitted statistics relating to the economic aspects of tuberculosis which are extremely interesting and significant. In 1921, it was estimated that the annual per capita cost of tuberculosis to the people of the United States was seven dollars and ninety-six cents, and that this burden, if distributed among those persons with active, clinically recognizable tuberculosis, amounted to one thousand two hundred sixty-two dollars annually for each patient. The total loss due to tuberculosis during the entire span of life of the population at the existing rate of mortality from tuberculosis at the time the estimate was made would amount to $27,125,000,000. Since the death rate from heart disease exceeds that from tuberculosis, it is reasonable to estimate that there is a much greater financial loss to the nation from this cause. Further, an inestimable economic loss occurs from the enormous group of cardiac cripples who are partially or totally disabled.

Minnesota has been indifferent toward its responsibility in the problem of heart disease. Action must be taken, and the appointment of the Heart Committee of the Minnesota State Medical Association has created a medical unit, responsible to the entire medical profession of the state, to formulate ways and means for the organization of the cardiac work in the state. In order to permit progress, the full coöperation of the profession is necessary and constructive criticism will materially aid the Committee in its work.

**Economic aspects of heart disease. American Heart Journal, 1929, iv, 251-267.

AN EPITOME OF SURGICAL SHOCK*

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THE object of this paper is to present in a concise way the more generally accepted causes of surgical shock, its prevention and relief. Having seen several cases in my hospital practice which had been inadequately treated, due to lack of appreciation of the principles involved, I thought it would be of interest, and possibly valuable, to present the accepted theory and practice of today.

Shock is a symptom-complex induced by psychic, traumatic or chemical means in which all the vital functions of the body are in a state of collapse. It is characterized by prostration, low blood pressure, almost complete cessation of secretion of saliva, gastric juice and urine; the patient is grey and shrunken, the temperature is subnormal and the mind is dull. Once seen it is never forgotten.

Many theories have been advanced to explain it. They all probably do to a certain extent, but there is no one cause, for the condition is a complex one. The earliest and best was the theory of vasomotor and adrenal exhaustion of Crile. Yandel Henderson's theory of acapnia was a most engaging one. Dale's work on histaminie and the experience during the war of the absorption of crushed tissue juices partially explained many a case of shock. The most recent work of Crile on intracellular acidosis and of Kamm on the metabolism of water have greatly advanced our knowledge of this interesting phenomenon.

In shock the blood vessels are comparatively empty and the tissues are dry. The blood apparently is in the terminal arterioles. This causes a lowering of blood pressure and, as we know, if the pressure in the vena cava gets too low the heart will cease functioning.

One other condition which is not often recognized is the exhaustion of the carbohydrate reserve. Stimulation, whether psychic, physical or chemical, liberates this, the only quickly available fuel for tissue activities. Continuation of these stimuli will exhaust the supply in the blood, in the muscles and in the liver. After all supplies are gone, further contraction of muscles, of blood vessels and of the heart itself, and activities of glands and the central nervous system become increasingly difficult. The body then falls back to using fats. But fats cannot burn completely without the concomitant combustion of carbohydrates. This results in acidosis, which still further depresses vital activities.

The treatment should begin with its prevention.

The psychic factor is often overlooked. Every patient approaches an operation with apprehension. A surgeon who is not whole heartedly convinced of the desirability of the operation and that the patient will be better off afterward than before, is not honest and the patient will sense it. Rigorous honesty and practice of the Golden Rule will mean that the patient will approach his ordeal in a hopeful frame of mind and the surgeon will do better work. A half convinced patient who is hurried to the operating room by the insistence of an operator is in a bad frame of mind and an apprehensive patient is already half shocked. Sugar in the urine is often present in excited or apprehensive patients, showing how much of the precious reserve is gone even before he is touched.

"Overpreparation" is to be condemned. Physicking is unnecessary. It may do positive harm by depleting the body of water and it certainly makes intestines harder to handle.

A good night's sleep is very important. If this does not come naturally, sedatives should be administered freely. A patient who has spent a restless, sleepless night is not in good condition for an operation. Before operation, fluids should be urged and carbohydrates given to raise the store of each and morphine to lower the irritability of the central nervous system.

All general anesthetics produce acidosis. They should be given by skilled anesthetists who are interested in its administration.

Nerve block anesthesia of some type should always be employed. It has been proven that the central and sympathetic nervous systems are stimulated by trauma while a patient is under

*Presented before the Ramsey County Medical Society, St. Paul, March 25, 1929.

general anesthesia even as when awake. This leads to liberation of epinephrin and sugar. If the stimuli of tissue trauma are prevented from leaving the area of operation, that factor is eliminated and much less of the general anesthetic is needed.

Incisions planned to minimize trauma by making underlying structures more easily accessible by avoiding blood vessels and, above all, nerves, will do a great deal to diminish trauma. Transverse incisions make these requirements easy to follow and give as good exposure in laparotomies as any other. Incidentally they are easy of closure and herniæ almost never occur. Sharp dissection and avoidance of trauma minimize tissue damage and absorption of tissue juices squeezed out by manipulation and reduce shock.

If in spite of these precautions shock has occurred, what shall be done?

1. Warm the patient. With exhaustion the temperature drops and the heat center vainly tries to bring it to normal, as fuel for that purpose is gone. External heat will arrest this loss of energy.

2. Give water in large amounts. The preferable route is by mouth, but if that is not possible, give it by rectum, under the skin or intravenously. This will add volume to the blood stream and also help to raise blood pressure. Water is essential to life.

3. Give morphine generously. This will reduce the irritability of the nervous system and thus prevent further shock and relieve the purposeless activity which these patients so often exhibit. It will reduce internal respiration and consequently the combustion of any remaining reserve. The dose should be large enough to be effective.

4. Give carbohydrates, preferably by mouth, as that is the quickest and most physiological. If that is impossible give intravenously and by rectum, but give it in large amounts. This will replace the depleted store of fuel and permit the fire of life to flame up again and break the vicious circle which exists in shock. If the condition is very grave, add insulin, as this will make the carbohydrates directly available and without any burden on the pancreas, which is also depressed.

5. Administer carbon dioxide. This does diminish acidosis and does raise blood pressure.

To reiterate:

Prevention.—

1. Proper preparation psychically and physically.
2. Nerve block anesthesia to prevent transmission of noxious stimuli from field of operation.
3. Skillfully given general anesthetics.
4. Properly planned incisions to minimize nerve and tissue trauma and absorption of products of trauma.
5. Patient kept warm during anesthesia and operation.

Treatment.—

1. Water.
2. Heat.
3. Morphine.
4. Carbohydrates supplemented, if necessary, by insulin and carbon dioxide.

CHOLECYSTITIS ASSOCIATED WITH DIABETES*

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A LITTLE less than half of our adult population suffers from disorders of the biliary system. If we are to take cognizance of the recent studies of those engaged in research concerning the liver and bile passages, 20 to 25 per cent of all adults have gallstones. Probably an equal number have cholecystitis without stones, according to Graham and his co-workers.

For a number of years past it has been recognized that there is a definite interrelationship between pancreatitis and cholecystitis, as evidenced by the writings of Elliott, Quenu and Duval, Mayo, Deaver and others.

Diabetes entering into the relationship between biliary disease and pancreatic disease began to be mentioned about fifteen or twenty years ago when Eustis became suspicious of an interrelationship and collected and reported his series of thirty-six cases of glycosuria beginning back as far as 1911. Fifteen of his cases showed definite gallbladder disease during observation over a long period of time. He found that up to the time of his report six of the fifteen patients had developed diabetes.

Rabinowitch in 1924 mentioned eighteen instances of patients who suffered both from diabetes and disease of the gallbladder and its passages.

Somewhat later, in 1925, Bigger and Mulholland reported thirteen autopsies on patients dying of diabetes and found that 38.5 per cent showed lesions of the biliary tract; 61.6 per cent showed evidence of pancreatitis and 38.5 per cent showed lesions both of the biliary tract and of the pancreas.

In a recent book by McKittrick and Root on "Diabetic Surgery" the authors have summarized the autopsy findings of forty-nine diabetic patients over twenty-five years of age, from the material collected from the records of the New England Deaconess Hospital. They found:

	Per cent
Cholecystitis with stones	26.5
Cholecystitis without stones	22.4
Incidence of gallbladder disease in diabetics	49.9

Wöhrmann in 1928 found an earlier or an existent cholecystitis in 24 per cent of 677 cases of diabetes.

Katsch in 1928 believed that cases of diabetes on the basis of gallbladder disease are much more frequent than is usually supposed, and he pleads for the coöperation of the family physician in this matter.

The writer having had occasion to observe this association, in several instances of the two diseases under discussion, has attempted the present study in an effort to find, if possible, more definite clinical or pathological points in common and to search for a kinship, closer perhaps than we now recognize.

A review, for the purposes of this study, of the autopsy records in the Department of Pathology at the University of Minnesota yielded fifty-three cases in which diabetes mellitus was a major factor in the cause of death. These records run back for the past six years. The charting was done to show the sex, age, blood-sugar findings, urinalysis, operative findings, if any, and the gross findings at autopsy. A summary of this tabulation will be found in Tables I, II, and III.

TABLE I

AGE AND SEX—53 AUTOPSIES ON DIABETICS

Ages	Cases	Females	Males
20–30	3	2	1
30–40	8	4	4
40–50	6	4	2
50–60	15	7	8
60–70	15	5	10
70–80	6	3	3
		25	28

TABLE II

PATHOLOGY OF LIVER—53 AUTOPSIES ON DIABETICS

		Per cent
Not stated	4	
No gross disease	1	
Cloudy swelling	25	50
Chr. Pass. Congestion	14	28
Fatty	7	14
Cirrhosis	2	4
Nutmeg	1	2
Metastatic Ca	2	

*Read at the meeting of the Western Surgical Association, Chicago, Ill., December 15, 1928.

TABLE III

PATHOLOGY OF PANCREAS—53 AUTOPSIES ON DIABETICS

		Per cent
Not stated	23	
No gross disease	5	
Atrophy	10	40
Fatty	4	16
Chr. Pancreatitis	3	12
Hyal. degeneration	3	12
Fibrosis	2	8
Sclerotic	1	4
Necrosis	1	4
Hypertrophy	1	4

Of the fifty-three autopsy records in which diabetes mellitus was a positive factor at the time of death, eleven were found (20 per cent) which showed definitely recorded cholecystitis or gallstones. These eleven cases were tabulated and are summarized in Table IV.

TABLE IV

AUTOPSIES ON 53 DIABETICS

		Per cent
Gross signs of cholecystitis	11	20
In these 11 cases		
Females, 10; Males 1.		
Age 50 to 70	8	72
Enlarged liver	5	
Liver weight—1,795 to 2,200 gms.		
Cloudy swelling	4	
Nutmeg	1	
Fatty	1	
Secondary infection (including gangrene of extremities)	6	

In addition to these eleven cases of cholcystitis and gallstones, there were seven (13 per cent) which showed miscellaneous pathological involvement of the gallbladder, as listed in Table V.

The seven cases last mentioned with gross suggestive lesions of the gallbladder, added to the eleven previously discussed, make a total of eighteen, or 33 per cent, which gave evidences of gallbladder changes associated with miscellaneous liver abnormalities.

A group of cases was selected from Joslyn's data consisting of cases coming to him from various sources and these showed that diabetes appeared from one to fourteen years before the diagnosis of gallstones was made. One-half of these fifteen cases (eight cases) went five years without a diagnosis of gallbladder disease and the rest went from five to fourteen years without such a diagnosis. At the present time, with the aid of the Graham-Cole test for gallbladder function, with its estimated 96 per cent accuracy, the diagnosis should undoubtedly be made earlier. It is interesting to note that there was but one death in the eleven operated cases, in this group.

Referring again to Joslyn's statistics: there were sixteen cases in which the onset of diabetes and the diagnosis of gallbadder disease occurred *at the same age.* Their ages ranged from twenty-eight to sixty. Of the number, eleven were females and five males. Seven were operated upon without any mortality and thirteen were alive in January, 1923, three having died without operation (ages 57, 65, and 66).

In order to ascertain whether the surgical mortality rate is higher among the younger patients, a group of eight cases was selected from Joslyn's material, the ages ranging from seventeen to thirty-five, as shown in Table VI.

In this group the females outnumber the males seven to one. Four had been operated upon without mortality. Three had died without operation and one was alive without operation.

A search of the records at St. Luke's and St. Mary's hospitals, Duluth, resulted in the finding of sixteen cases in which the records were of value for this study.

Tabulation and summary of this group of sixteen cases shows:

1. Five at post-morten showed either cholecystitis or gallstones.
2. Two gallbladder cases were diagnosed from symptoms and Graham-Cole test.
3. Nine were operated upon (four with drainage of gallbladder; five with cholecystectomy).

One of the latter five returned later with symptoms of common duct stones but refused operation.

Cholecystectomy produces a more favorable result than drainage of the gallbladder. The diabetes in drainage cases improves only temporarily, and is likely later to become aggravated.

D. F. Jones at the New England Deaconess Hospital, Boston, states that cholecystectomy is the operation of choice and Joslyn feels that if there is no improvement in the diabetes after cholecystectomy there is something else wrong with the patient. As a matter of fact there has been an improvement in practically all of their operative cases and there was no mortality.

Sufficient attention has been called to this subject by various writers to stimulate a vigilant attitude on the part of practitioners handling diabetes cases. If a cholecystitis complicates the diabetic picture, it is best to discover the fact, before irreparable changes in the pancreas take place. Barron states that what is generally understood as the relation of the pancreas to diabetes is rather the relation of the islands of Langerhans to that disease. The islands are about three and one-half times as numerous in the tail of the pancreas as elsewhere, according to Opie. Heiberg and others found that in the pancreas of the diabetic there were less than two-thirds as many islands in the tail as normal. Barron has made the observation also that whenever diabetes is caused by a lesion of the pancreas, the lesion always involves the islands. He states further that changes in the islands, such as degeneration, necrosis and fibrosis, generally occur late in the disease, probably as a result of a superimposed secondary infection, consequent to prolonged stasis in the ducts.

Insulin therapy, rationally applied, serves to prolong the lives of diabetics. Symptomatically, these patients can be held under control for varying lengths of time. However, the underlying pathological condition, so far as we know, is not affected by the insulin. The main object of insulin therapy is to increase the carbohydrate tolerance of the individual. The curative value of insulin has never been claimed. It is, however, a most valuable therapeutic agency in the treatment of diabetes.

Attention was drawn earlier in this paper to the fourteen year period which elapsed in the life of a diabetic before the diagnosis of gallstones was made. These "silent" cases of gallstones or of cholecystitis will be brought to light earlier, now that we have the functional test of the gallbladder as developed by Graham and Cole. The writer feels that, in the diabetic, this test should perhaps be done in all cases, no matter how young. Young people are more subject to cholecystitis than was believed to be possible several years ago. The writer has recently seen a fat girl of twelve operated upon for cholecystitis and has himself operated on several young women under twenty, for cholecystitis with gallstones.

It is encouraging to note from the information in Joslyn's tables that the result of gallbladder surgery in diabetes is very satisfactory. There was practically no surgical mortality. Seven in one group and four in another were operated upon without mortality. Three in each group died without operation.

CONCLUSIONS

1. There were pathologic gallbladders in 33 per cent of this group of diabetics.
2. The females outnumbered the males on the ratio of 54 to 19.
3. The gallbladder as a focus of infection in diabetics should be investigated.
4. Cholecystectomy is preferable in diabetics to gallbladder drainage.

Note: I have been permitted to add the following cases to the above report through the courtesy of Dr. M. Mc. Fischer:

1. A white female, aged 43, had an appendectomy performed in 1921. She now has tenderness over the gallbladder. Urinalysis shows sugar two plus and a trace of acetone. Graham-Cole functional gall-bladder test positive. No operation to date.

2. A white male, aged 57, complained of weakness and weight loss from 220 to 183. On examination one dental root abscess was found to be present. There was tenderness over the gallbladder. Urinalysis: acid, albumin two plus, acetone one plus, sugar four plus. Graham-Cole positive. No operation to date.

3. A male, aged 61, was known to have had diabetes for three years. He has had two attacks of gallstone colics. There was tenderness over the gallbladder. The Graham-Cole test showed poor filling and thirty-six hour retention and numerous stones. Cholecystectomy was performed. The gallbladder contained stones. Recovery was uneventful. Five weeks postoperatively the patient is sugar-free and on a diet of C75, P65, F110.

The case reported recently by Emerson is also of interest.

A female, aged 54, gave a diabetic family history, the mother and two sisters having been diabetics. The patient had a weakness and some loss of weight and tenderness in the right upper quadrant. The Graham-Cole test was positive. Urinalysis: sp. gr. 1,010, no albumin, sugar 4 per cent. Blood sugar 250 gm. Cholecystectomy was done. The gallbladder contained stones. The patient was discharged on the thirteenth day, on a diabetic diet. Three months later the patient was on a general diet, sugar-free, and the blood sugar was 120 mg.

BIBLIOGRAPHY

1. Barron, M.: Surg., Gynec. and Obst., 31, 437, 1920.
2. Bigger and Mulholland: Virginia Med. Month., 52, 294 (Aug.), 1925.
3. Crofton: Surg., Gynec. and Obst., 7, 624, 1908.
4. Deaver: Surg., Gynec. and Obst., 28, 433, 1919.
5. Elliott: Surg., Gynec. and Obst., 6, 78, 1908.
6. Emerson: Jour. Am. Med Assn., 91, 1632 (Nov. 24), 1928.
7. Eustis: New Orleans Med. and Surg. Jour.

TABLE V

CASES OF DIABETES MELLITUS WITH OTHER MISCELLANEOUS PATHOLOGY OF THE GALLBLADDER

Case	Sex	Age	Blood Sugar	Sugar in Urine	Operation	Gross Findings at Autopsy
691 (1923)	F	59	.290	yes	——	Liver soft, friable, with cloudy swelling. Gallbladder adherent to colon. No stones. Arteriosclerosis.
739 (1924)	M	33	.416 .789	yes	——	Liver pale brown, swollen and fatty (2,930 gms.). Cloudy swelling. Gallbladder distended with dark bile. Discharging right ear.
842 (1924)	F	58	.454	6-25 gms.	——	Liver weighed 2,230 gms. Metastatic masses from primary carcinoma of the gallbladder. Chronic pancreatitis with necrosis. Gallbladder tense and contained mucin and tumor mass. Ducts patent. Gangrene of both feet.
308 (1926)	F	62	?	yes	——	Liver fatty (2,478 gms.). Pancreas showed fatty infiltration. Gallbladder markedly distended. Gangrene of left leg.
310 (1926)	M	65	?	yes	——	Chronic passive congestion of liver (weight 2,030 gms.). Gallbladder thickened. No stones.
583 (1926)	F	37	?	yes	Thyroidectomy (Exoph. goiter)	Cloudy swelling of liver (weight 1,490 gms.). Mucosa of gallbladder shows spots of separation. No stones.
1145 (1926)	F	41	.250	yes		Liver (?) Atrophy of pancreas. Gallbladder normal in size and contains brown mucid bile. No stones. Ducts patent.

TABLE VI

YOUNGER PATIENTS (JOSLYN)

Case	Sex	Age of onset of diabetes	Age gallbladder disease diagnosed	Duration of diabetes (living Jan., 1923)	Duration in years before death	Age at Operation
310	F	17	21	—	21	—
981	F	28	27	—	2	—
1389	F	25	27	—	5	—
1592	F	28	28	6	—	28
2190	F	27	31	8	—	31
1390	F	31	28	6	—	28
309	F	35	20	25	—	—
2200	M	35	35	9	—	35

8. Graham *et al*: Diseases Gallbladder, etc. Lea & Febiger, p. 144, 1928.
9. Heiberg: Deutsch. med. Wchnschr., 43, 255, 1916.
10. Jones, D. F: Personal communication.
11. Joslyn: Treatment of Diabetes, 2d edition.
12. Kamimura: Mitt. a. d. Med. Fakvet. d. k. Univ. zu. Tokyo, 17, 95, 1917.
13. Katsch: Deutsch. med. Wchnschr., 54, 1508 (Sept. 7), 1928.
14. Kodama, S.: Surg., Gynec. and Obst. (Aug.), 1926.
15. Mayo, W. J.: Surg., Gynec. and Obst., 7, 607, 1908.
16. McKittrich and Root: Diabetic surgery, p. 232.
17. Opie: Diseases of the pancreas, 2d Ed., 1910, p. 257.
18. Rabinowitch, J. M.: Can. Med. Assn. Jour., 14, 296 (Apr.), 1924.
19. Wohrmann, W.: Ztschr. f. klin. Med., 108, 581 (Aug. 18), 1928.

OBSERVATIONS ON THE CAUSE AND PREVENTION OF INFLUENZA AND INFLUENZAL PNEUMONIA*

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IN THE pandemic of influenza of 1918 and 1919 extremely important experimental results bearing on the etiology of influenza were obtained with *Bacillus influenzæ* by Blake and Cecil, Duval, Parker and others, with green-producing and hemolytic streptococci by Rosenow and with staphylococci by several workers. On the basis of this work I suggest the following hypotheses: Peculiar strains of these organisms occurring individually or symbiotically should be considered the cause of the varied manifestations of influenza. Mutation or "dissociation" in the pneumococcus-streptococcus group normally present in the upper respiratory tract in human beings, sudden acquirement of exalted and peculiar virulence, especially of the streptococcus group, and hypersensitiveness or allergy to the bacterial proteins should be considered as important factors in the production of the peculiar manifestations of this disease.

To quote from one of my published reports: "The freshly isolated strains from influenza and its accompanying lesions have been found to produce relatively large amounts of 'anaphylatoxin' both in vitro and in vivo. The idea that the virulence of these bacteria may depend in part on their ability to produce 'anaphylatoxin' is in accord with my previous finding that virulent pneumococci and their filtrates produce a larger amount of this toxic substance than avirulent pneumococci. The picture in animals is clearly that of an anaphylactic intoxication, and suggests that the symptoms and lesions in man as recorded by numerous observers may likewise be due to this cause in which sensitization of the host to the bacterial proteins may or may not play a part. Findings as follows indicate this mechanism: (1) the delay in the coagulation time of the blood, leukopenia and cyanosis; (2) the marked tendency to develop acute pulmonary edema with a distended lung and relatively immobile expanded chest and extreme respiratory effort; (3) the voluminous lung as found at necropsy; (4) the occurrence of the rupture of alveoli and consequent subcutaneous emphysema (bronchial spasm); (5) the frequency of abortion (contraction of unstriped muscle) and other uterine disturbances."

The small anaërobic organism isolated from filtrates by Olitsky and Gates in the early stages of influenza should be regarded as being related to the streptococcus-pneumococcus group. They have shown that after long cultivation the organism becomes less anaërobic, of larger size, and of fairly typical streptococcal morphology.

The time, it seems to me, has fully arrived when epidemiologists and boards of health should acknowledge that while common-sense measures of quarantine are indicated the disease cannot be adequately controlled in this way. However important contact infection may seem to be, it is not the fundamental factor that causes epidemic and pandemic waves of this disease to appear and disappear so suddenly and so mysteriously at varying intervals of time.

I have found that the bacterial flora of the present epidemic in Rochester and in Minneapolis, Minnesota, and in Miami, Florida, is the same. Furthermore, it is like that of the pandemic of 1918 and 1919. The disease fortunately is milder and correspondingly the virulence of the streptococci is less marked. The green-producing streptococcus has been found constantly present in pure culture or in predominating numbers in the early stages of the disease, and the hemolytic streptococcus alone, or in mixture with the green-producing streptococcus, has been found later, especially in the secondary attack. *Bacillus influenzæ* and staphylococci have been found in goodly numbers in about one-fourth of the cases.

Instability and a marked tendency to the development of mutational forms have been noticed in the respective strains isolated in this epidemic. Similar features were noticed in the pandemic of 1918 and 1919.

A summary of the results of the use of the vaccine during the pandemic of 1918 and 1919 is given in the tabulation.

*From the Division of Experimental Bacteriology, The Mayo Foundation, Rochester, Minn., presented at the National Conference on Influenza, Washington, D. C., January 10, 1929.

TABULATION

RESULTS IN PERSONS VACCINATED THREE TIMES IN THE PANDEMIC OF INFLUENZA OF 1918 AND 1919

			Incidence in Each 1,000 Persons		
	Groups	Persons	Influenza	Pneumonia	Deaths
Nineteen counties in Minnesota	Vaccinated	17,532	102.8	4.2	0.8
	Unvaccinated	36,100	373.5	20.4	6.35
Olmsted County, Minnesota	Vaccinated	9,300	41.0	3.0	0.64
	Unvaccinated	8,700	248.0	13.1	4.00
Institutions	Vaccinated	8,306	31.0	1.0	0.5
	Unvaccinated	9,388	200.0	12.0	5.9
Hospitals	Vaccinated	57		21.0	5.0
	Unvaccinated	609		57.0	22.0
Results from questionnaires	Vaccinated	93,476	87.0	4.4	1.43
	Unvaccinated	345,133	281.0	21.0	8.55
Influenza complicating pregnancy	Vaccinated	997	109.0	27.0	14.0
	Unvaccinated	3,656	294.0	80.0	59.9

The incidence of influenza and pneumonia, and the mortality rate, were consistently higher among the unvaccinated than among the vaccinated persons in each of the different groups studied.

The incidence of influenza was from three to six times as great and on the average was four times as great in the unvaccinated control groups as in the vaccinated groups. This observation was not anticipated since the vaccine was used only in the hope that the complicating pneumonia and the death rate might be lowered. Pneumonia occurred from three to twelve times as often in the unvaccinated as in the vaccinated groups. Deaths were from four and a half to nine and a half times as frequent in the unvaccinated as in the vaccinated groups. These differences are believed to be too great to be explained on the basis of statistical or other error in compiling the results, and therefore seem attributable to the vaccine.

The largely negative results of Jordan and Sharp obtained in 1920 should not be interpreted as nullifying the positive results which I have obtained. In their work no particular care was exercised to incorporate freshly isolated strains, especially of the green-producing and hemolytic streptococci, which were so predominatingly present. I used freshly isolated strains. They worked at a time when the bacteria found, as well as the clinical manifestations, were far more heterogeneous and the disease less virulent. The amount of streptococcus viridans, the peculiar green-producing streptococcus in their vaccine, was approximately a half of the amount which was present in my vaccine. A sixth of their vaccine consisted of *Bacillus influenzæ,* against which, as is well known, it is more difficult to immunize than against pneumococci or streptococci. My vaccine contained at first a smaller proportion of influenza bacilli than theirs and later no influenza bacilli, but staphylococci instead. Their organisms were killed by heat; mine were killed by cresol. Moreover, in their series, as in mine, most of the patients declared that they had received definite protection against colds. Differences in epidemics and in the vaccines used may readily explain the discrepancies in the results obtained.

The bacterial flora of the present epidemic seems to be much like that of 1918 and 1919; at that time seemingly unmistakable good results were obtained from a mixed vaccine made to contain a high proportion of freshly isolated strains.

I would recommend, therefore, that a concerted effort on a large scale be made against this disease by means of vaccines prepared from freshly isolated strains in proportions approximating the bacterial flora at hand in different localities. This work has already begun in Rochester.

The bacteria are grown in gallon bottles of broth; this is clarified, and the bacteria then are stored in dense suspension in glycerin and sodium chloride solution. The vaccine is made by diluting these dense suspensions with sufficient sterile sodum chloride solution. These dilutions are heated at 70° C. for one hour and 0.3 per cent phenol is added as a preservative. One cubic centimeter is made to contain 5,000,000,000 killed bacteria. Three subcutaneous injections of 0.3, 0.5 and 1.0 c.c., respectively, are given at weekly intervals and then a monthly injection of 1.0 c.c. for as long a time as needed. The dosage for children should be about half and for infants about a fourth that for adults.

The vaccine is sent gratis to physicians by The Mayo Foundation in the hope that information of value as regards the good that may be accomplished in this way will be forthcoming. In order to estimate the value of the vaccinations, physicians are requested to be sure to record the name, sex, age, occupation, the degree of reaction, the date and number of vaccinations and the date, duration and severity of attacks of respiratory infections in those vaccinated. So far as possible they are requested to give similar data concerning unvaccinated persons living under similar circumstances or who live or work in the same household, shop or office.

BIBLIOGRAPHY

1. Jordan, E. O., and Sharp, W. B.: Influenza studies; effect of vaccination against influenza and some other respiratory infections. Jour. Infect. Dis., 1921, xxviii, 357-366.
2. Olitsky, P. K., and Gates, F. L.: Experimental studies of the nasopharyngeal secretions from influenza patients. VIII. Further observations on the cultural and morphological characters of *Bacterium pneumosintes*. Jour. Exper. Med., 1922, xxxv, 813-821.
3. Rosenow, E. C.: Studies in influenza and pneumonia. II. The experimental production of symptoms and lesions simulating those of influenza with streptococci isolated during the present pandemic. Jour. Am. Med. Assn., 1919, lxxii, 1604-1609.

RELIEF OF EARACHE BY PHENOL-GLYCERIN MIXTURE

Drops for earache that immediately and continuously give relief are not available, nor are they desirable, as they would mask the symptoms and permit middle ear suppuration to go on to mastoiditis with all its dangers and sequelæ. Instillation, as hot as can be borne, of glycerin with 5 per cent of phenol is usually adequate to relieve pain of acute non-suppurative middle ear inflammation. If this does not suffice, prolonged irrigation of the ear canal with water as hot as can be borne, usually gives a great deal of relief. (Jour. A. M. A., April 27, 1929, p. 1471.)

PHENOBARBITAL

Phenobarbital is the name given by the Revision Committee of the U. S. Pharmacopeia for the product introduced as luminal. Jobbers supply luminal on orders for pheno-barbital-U.S.P. In the past, this has been the only thing which they could do, as the Winthrop Chemical Co., Inc., proprietors of luminal, own the patent for this substance. The patent expires, however, May 7, 1929, and several manufacturers are already preparing to put non-proprietary brands of phenobarbital-U.S.P. on the market after that date — which, of course, will be sold under the official name. (Jour. A. M. A., April 13, 1929, p. 1295.)

THE SIGNIFICANCE OF LOWER URINARY TRACT FINDINGS IN UPPER URINARY TRACT DISEASES

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IN many diseases of the upper urinary tract, certain definite findings in the lower urinary tract may be found which are extremely important in making, or helping to make, a diagnosis. Oftentimes these findings are apparently insignificant, and, if overlooked or disregarded, may be misleading, whereas if observed and properly interpreted, they may clinch an otherwise uncertain diagnosis. Occasionally difficulties in ureteral catheterization may force the cystoscopist to rely entirely upon his visual findings of the bladder in determining the renal pathology. Some visual cystoscopic findings are in themselves pathognomonic of certain renal conditions but if care in interpretation is not exercised, the wrong conclusion may be reached.

RENAL TUBERCULOSIS

The variability of the urinary symptoms in tuberculosis of the kidney is very marked. For this reason one must always be on guard and, if any signs present themselves which suggest it, a thorough examination should be made until the condition is ruled out. A patient with renal tuberculosis may be symptomless and cystoscopy indicated only because of the presence of blood or pus in the urine or he may complain of very extreme nocturnal and diurnal frequency. Any sign, therefore, which arouses the suspicion of the examiner is of greatest importance. Renal tuberculosis may cicatrize the bladder or ureter to such an extent that insertion of ureteral catheters is impossible. Because of this, it may be readily seen how important it is to suspect renal tuberculosis from the appearance of the bladder and the ureteral orifices.

Ordinarily renal tuberculosis causes secondary bladder changes which are quite characteristic. The bladder is very painful and appears highly inflamed on examination. The mucosa becomes fiery red, oftentimes in circumscribed areas, most frequently adjacent to the ureteral orifice of the affected kidney. Many times the mucosa will ulcerate and bleed on overdistension. In very rare cases tubercles may be seen in the bladder mucosa. They appear as small, whitish areas in the center of very red areas of inflammation. The ureteral orifices themselves frequently take on characteristic appearances. The urinary spurt may be cloudy in appearance from one side in comparison to the other, which is clear. The orifice may be displaced from its usual position, being retracted laterally a distance of two or three centimeters. The orifice may appear highly inflamed or be buried in a mass of inflammatory tissue. Or it may appear patulous, that is, fixed and open, and has been described as the "golf hole" meatus.

Renal tuberculosis causes pathological changes in the ureter which may aid in diagnosis. Tuberculous strictures are usually characteristic in appearance and can be easily differentiated from other inflammatory or spasmodic narrowings. They are dense, fixed, multiple, extending over wider areas, with irregular edges. Between the strictured areas, there may be sacculations. This can easily be brought out by a ureterogram. Recently we examined a patient in whom symptoms had been present only three weeks. The bladder was slightly suggestive of tuberculosis in that small areas of highly inflamed tissue surrounded the left ureteral orifice and no urinary spurt could be seen coming from the meatus. An obstruction was encountered in the ureter about one centimeter above the bladder. An attempt to obtain a pyelogram was made by injecting the lower ureter. A good outline of the ureter was obtained but the pelvis was not filled sufficiently to be of any diagnostic assistance. In spite of this and in spite of repeated negative stains of the urine for the tubercle bacillus, we were able to make a diagnosis of renal tuberculosis from the appearance of the bladder and from the ureterogram. This was borne out at operation. At times the ureter may be occluded at some point and the presence of a strictured, sacculated ureter below warrants the diagnosis of occluded renal tuberculosis.

The presence, therefore, of any of the above mentioned signs; a highly inflamed irritable

bladder, an ulcerated bladder, particularly when adjacent to one ureteral orifice, a mucosa containing tubercles, displacement laterally of the meatus, a "golf hole" meatus, an orifice buried in a mass of inflammatory tissue, a unilateral spurt of cloudy urine, a strictured, sacculated ureter, is sufficient to make one suspicious of, and at times definite enough to permit one to make a positive diagnosis of, renal tuberculosis.

PYELONEPHRITIS

The bladder frequently shows typical findings in bilateral pyelonephritis. Occasionally the findings are definite enough to make a positive diagnosis before catheterized renal specimens are obtained. The vesical mucosa shows a diffuse mild cystitis in contradistinction to the ulcerated, fiery red, areal cystitis of tuberculosis. The presence of large amounts of white flocculent pus in the base of the bladder is practically pathognomonic. The urinary spurts from both meati are cloudy or turbid. In the presence of these findings bilateral pyelonephritis may be suspected with a fair degree of certainty. Examination of catheterized ureteral specimens will definitely prove one's suspicions.

PYONEPHROSIS

Pyonephrosis can be diagnosed more accurately as a rule from visualization of the ureteral orifice on the affected side than by any other method. A differential diagnosis of pyonephrosis from an infected hydronephrosis can not be made from the pyelogram but pyonephrosis betrays its presence in most cases by exuding thick, creamy pus through the ureteral orifice. This gives the appearance of dentifrice being squeezed from a collapsible tube and has given rise to the descriptive term "tooth-paste pus." When this is seen a positive diagnosis may be made without further investigation.

RENAL TUMOR

The most constant subjective symptom in tumor of the kidney is hematuria. With the history of bleeding and a bladder which is cystoscopically normal, one's attention must be focused on the kidneys as the likely origin. In this connection, we wish to emphasize the advantage of the direct cystoscope over the indirect. It can readily be seen how important it is to examine the patient while he is bleeding in order to determine the source. The field of vision and the point of entrance of the cystoscopic fluid in the indirect cystoscope are not the same. A bloody field renders the examination unsatisfactory or impossible. With the direct cystoscope the field of vision and the site of entrance of the media are the same and there is no difficulty encountered from hemorrhage as the fluid continually washes the field of vision. Blood seen coming from a ureteral orifice gives a very characteristic appearance. Each urinary spurt resembles a puff of thick white smoke and when once seen is not easily forgotten. This finding in itself suggests the possible presence of renal tumor and should immediately suggest pyelography to the examiner.

Papillary epithelioma of the renal pelvis, in addition to the above sign, gives other characteristic findings. Occasionally a tag of tumor tissue is seen protruding from the ureteral orifice. Transplants of the tumor may be present in the vesical mucosa. This finding is extremely suggestive of the condition, while the protruding tags are pathognomonic. Pyelography usually corroborates the diagnosis.

RENAL FUNCTION

The differential functional test has become a well established procedure. In fact now it is practically unheard of to operate for any renal condition without knowing the relative function of each kidney. The phenolsulphonephthalein test is most generally used. However, at times it is very helpful to be able to determine renal function without ureteral catheterization. Ten cubic centimeters of indigo-carmine given intravenously will color the urine in about four minutes in a normal kidney. Its color should be deep blue. When a diminution of function exists in one kidney, there is a delay in the appearance time of the dye and the color is much lighter. After a certain amount of experience with this test, fairly accurate differential functional tests may be obtained.

CONCLUSION

From the above considerations it may readily be seen that a definite diagnosis of the above enumerated renal conditions can be made in a certain number of cases from visualization of the bladder through the cystoscope. In other cases very valuable and suggestive data may be obtained which will lead one to suspect certain renal pathology and direct his efforts to further investigation in arriving at a positive diagnosis.

SURGERY FROM THE PEDIATRIC STANDPOINT*

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IT WOULD be futile for me, in the short time at my disposal, to try to discuss all the surgical conditions which we meet in children. Instead, I wish to speak of a few general considerations dealing with surgery in infancy and childhood.

The first is in regard to diagnosis. Because of the inability of small children to talk and the inaccuracy of many older children in describing symptoms, it is often extremely difficult and sometimes impossible to make an accurate and absolute diagnosis, and this is particularly true in surgical conditions of the abdomen. Naturally, we all want to make a definite diagnosis of the actual condition before advising operation. This is as it should be, but at times may lead to unnecessary and dangerous delay. The main duty of the man examining the child is to determine whether or not a surgical condition exists, and not what the actual diagnosis is. The acute abdominal conditions most commonly met in children are acute appendicitis, intestinal obstruction, subphrenic abscess, inflammation or obstruction of Meckel's diverticulum, peritonitis (either primary or secondary), pelvic abscess, and rupture of some abdominal or pelvic organ due to trauma.

In the majority of cases it is comparatively easy to arrive at a definite conclusion as to the actual condition before operation, but sometimes it is impossible or at least requires considerable observation, study and time to do so. In children the time element is often a very important one and a delay of a few hours may mean the difference between a normal and easy convalescence and recovery, and either death or a stormy, protracted recovery. For this reason, I think it well to call attention again to the fact that the first and essential thing is for us to determine whether or not we are dealing with a surgical condition within the abdomen, and, if so, to proceed at once with surgical intervention, even though we are unable to state definitely the exact diagnosis.

In dealing with children, one constantly meets the problem of whether or not the child should have his tonsils and adenoids removed. On the whole, I believe, most men tend to be more conservative in their attitude towards this question than formerly. I do not intend to discuss the indications for tonsillectomy and adenoidectomy, but wish to speak of the age at which it is safe and wise to operate, granted that we feel that the condition of the child's tonsils and adenoids warrants removal. There has been a more or less widespread tendency to set definite age limits before which the operation should not be performed, and to my mind this is wrong in principle. The age limit which has been set has varied with different men, but I think the one I hear most commonly stated is three years. Some place it at five years, and some place it as low as two. There are two factors which have commonly tended to bring about this feeling that a child should not have the operation performed when very young. One is the fact that in very small children it is difficult for the operator to do a thorough operation because of the small space in which he has to work. The other is the fact that there is a definite cycle of development of the lymphoid tissue in childhood, and that in infancy and the first few years of life, the child is in the stage where the lymphoid tissue tends to grow rather rapidly. Because of this, if the tonsils and adenoids are removed at a very early age, there is a tendency of some recurrence of the tissue later on. I think these two factors should be recognized and I am not an advocate of the early removal of tonsils and adenoids unless it is absolutely necessary. However, I am a very strong believer that if one feels that, because of the condition of the tonsils and adenoids, the child's health and development are being impaired, he should advise their removal, regardless of the age. I doubt if there is any more danger in having the operation done in a child under two years old than there is in an older child or adult. There is however, as stated before, the greater danger that later on it may be necessary to repeat the operation, and I think the parents should be warned of this. This fact,

*Read before the Hennepin County Medical Society, Minneapolis, Nov. 21, 1928.

however, should not deter us from having the operation performed when we are convinced that the child will be benefited by it. I have had the tonsils and adenoids removed in one child seven months old and in several about one years of age, and all of them got along as well if not better than older children who have had the same operation. These were all babies in whom I was convinced that there was definite danger in leaving the tonsils and adenoids in, and they were all markedly benefited by the operation. I do not think we should ever advise this operation in small infants and children unless convinced that there is real disease present; but if we have that conviction, we should not hesitate to have the diseased tissue removed.

Empyema is a condition which we meet all too often in children as well as in adults. It is unwise and almost criminal to attempt radical surgical intervention in empyema while the acute pneumonic process is still present. The mortality in infants and children was even greater than in adults, in the days when early rib resection was done for the treatment of empyema. I think everybody realizes perfectly today that the closed method of drainage is the one which should always be tried in dealing with those cases of empyema which do not clear up with simple aspiration. In the great majority of cases in infancy and childhood, the closed method will work successfully. However, in the last few years, so much has been written upon the advantages of the closed over the open method of drainage that I think sometimes we forget that there are a few cases which do not yield to this treatment. These are the cases in which aspiration has been employed in the acute stage and then the closed method has been instituted for some time, but still the temperature persists, and the child does not seem to be gaining ground, and, in fact, is losing. To my mind there comes a time when one should resort to a rib resection in these cases, and it should not be delayed too long. It can be done with comparative safety if the child is well past the acute pneumonic process. I would emphasize again that it is only in the exceptional case that this procedure will be necessary, but I think we should recognize the fact that there are such cases. I realize that there are some men who would answer me in this stand by saying that if the closed method is properly done, and adequately carried out, it will not fail; hence the open method should never be necessary. The answer that I would make is that, if this is so, there are many very excellent surgeons who have had training and experience in chest surgery who do not know how to do the closed method properly and that until the surgeons as a whole have learned how to do it so that it is always successful, we must not subject some of our empyema children to danger by stubbornly sticking to a method when it does not work. Personally, I do not feel that the closed method will always work in children, regardless of how or by whom it is done. One factor which may cause its occasional failure is the restlessness and constant movement of children with the resulting difficulty of keeping the closed drainage system tight and working.

In conclusion, I would state again that I think the closed method should always be tried and that in the vast majority of cases it will prove most satisfactory; but I do feel that we should recognize that there are exceptions and we should not delay too long in resorting to the open method when it is indicated.

I should next like to speak briefly about anesthesia in infancy and childhood. First, it has been my observation that children, even to the smallest of infants, stand general anesthesia, when properly given, very well. I have seen several babies only a few days old anesthetized over fairly long periods of time with no ill effects. In fact, I think infants and children, as a whole, tolerate general anesthesia better than adults. Many seem to fear general anesthesia in children and I really feel that this fear is unfounded. My conviction in regard to this leads me to speak against the widespread use of local anesthesia in children. For me to attempt to make any absolute rules in regard to anesthesia would be obviously absurd. I realize that there are certain cases in which it is wise and best to use local anesthesia; but certainly in the vast majority of cases it is best to use general rather than local anesthesia when dealing with infants and children. In this discussion I am referring particularly to operations other than very minor ones. My chief reason for feeling as I do is that although children as a rule stand surgery very well, they do not tolerate prolonged surgical procedures with safety. In the great majority of operations that I have observed, it has taken longer to do a given operation where lo-

cal rather than general anesthesia was used. This is particularly true of abdominal operations and it is here that the time element seems to be a particularly important one. The operation for pyloric stenosis will serve to illustrate my point in regard to the prolongation of the time necessary to perform the operation under local anesthesia. Although I have seen several beautiful results obtained in doing the Ramstedt operation for pyloric stenosis under local anesthesia, more than once have I seen the operator have considerable trouble. . The operation may go along perfectly until the abdomen is opened and then, because of some pain caused by the operation, the baby becomes restless or starts to cry. With the straining brought about by the crying, the abdominal contents tend to come out through the incision and even if they can be kept in place, it is extremely difficult if not impossible for the operator to proceed. A nurse hurriedly gets a nipple for the baby to suck, hoping that this will stop the crying, which it sometimes does, temporarily, but more often the baby continues to cry or soon starts again, and quite often after considerable time has been wasted, ether has to be given before the operator can proceed. I admit that this is an extreme example, but it has been my experience that local anesthesia does tend to lengthen the time of most operations.

Another factor that must be considered in choosing between general and local anesthesia is the fear and shock which may occur in case the local anesthesia does not work perfectly. This applies, of course, particularly to children beyond the age of infancy. In most operations done under local anesthesia there is no pain, but even in the hands of the most skilled workers, there are times when it is not completely successful and I have seen children subjected to pain and fear with resulting shock which could have been avoided if general anesthesia had been used. To summarize the point, I feel that, except in certain isolated and specific cases, local has no particular advantages and has some definite disadvantages over general anesthesia.

COLLOIDAL MERCURY SULPHIDE-HILLE

The Council on Pharmacy and Chemistry reports that the Hille Laboratories, Inc., Chicago, requested recognition of Colloidal Mercury Sulphide-Hille as a colloid prepared by the "condensation method," the stabilizing medium being a hydrolyzed protein "free from the properties responsible for the production of anaphylaxis in rabbits." As evidence for the value of the product the firm submitted the manuscript of a paper by G. E. Wakerlin and C. Eiseman which has been published, the manuscript of an unpublished paper by Wakerlin, and clinical data by R. H. Paterson. The unpublished paper by Wakerlin gives the results of preliminary animal experimentation which do not permit definite conclusions. The clinical trials of Paterson should be given little weight and cannot be taken to exclude risks from intravenous injection. The unpublished paper by Wakerlin (which is to be published in the Archives of Dermatology and Syphilology and was considered by the Council at the request of its editor) is thus far the chief available evidence in favor of Colloidal Mercury Sulphide-Hille and it seems to show that the product is now ready for clinical trial. The Council postponed consideration of the acceptance of the product to await the results of clinical trials. (Jour. A. M. A., April 20, 1929, p. 1349.)

ORAL ADMINISTRATION OF TYPHOID VACCINE

Recently two investigators have observed the effect of oral administration of typhoid vaccine on antibody formation. Using the triple vaccine they found that 88.5 per cent of their subjects developed agglutinins for typhoid and a lesser number for paratyphoid bacilli. This is compared to 80 per cent who, according to the literature, developed agglutinins after subcutaneous inoculation and to 90 to 95 per cent who show a positive Widal reaction after suffering from the disease. The administration of bile before the vaccine increased the percentage and shortened somewhat the latent period in which agglutinins are developed. This interval, the investigators find, is no longer when the oral method is used than it is for the more orthodox method. Complement fixations and precipitins were tested in a smaller number of persons and were found to be present more frequently than in the case of subcutaneous inoculation. These results show a closer similarity in antibody formation to the immunity reaction of typhoid on the part of oral than of subcutaneous administration. However, clinical resistance to disease may not correspond accurately with the development of agglutinins or precipitins. A method so well proved as subcutaneous inoculation against typhoid will not be lightly abandoned. (Jour. A. M. A., April 6, 1929, p. 1185.)

PELLAGRA FOLLOWING ALCOHOLISM*

REPORT OF TWO CASES

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PELLAGRA is defined by Ormsby as a chronic, constitutional, endemic disorder, characterized by symptoms referable to the cutaneous, gastro-intestinal and nervous systems, and having a tendency to seasonal recurrence.[1]

As a disease entity, it was first observed in 1732 by Gaspar Casal of Spain, but was not reported by him until 1762. From 1762 to 1776 the names of Anto Pajuta, Odoarti, and Frapolli are closely associated with the historical résumé of the condition. In 1771 Frapolli of Milan named the new entity pellagra, the derivation being from the Latin *pellis* (the skin) and *aeger* (the diseased). In earlier years large groups of cases in pellagrous communities were being reported, as well as were isolated cases in other parts of the world; but in recent times early recognition of the condition and the more frequent clinical diagnosis has shown it to be of widespread geographical distribution.

The etiology of pellagra is as yet not definitely known, but even in the earliest times it was believed to be related to a disturbed dietary régime. Early workers thought that it resulted from the eating of corn, either as a result of a toxic product contained in the corn or else formed in the corn through the action of molds of bacterium. This was the so-called Zeist theory. Many agencies have been purported as the causative factor until Goldberger, by an epidemilogical and statistical study, showed that a definite relationship existed between pellagra and diets which were high in cereal content and low in the fresh animal protein elements.[2] He further demonstrated experimentally the production of pellagra by the use of diets low in the pellagra-preventive factor, and the alleviation of the symptoms thus produced by the introduction into the diet of those elements rich in the same factor.[3] As yet, however, the nature of the pellagra preventive factor itself is unknown.

Pellagra may be found associated with other pathological processes in the body, processes which by their nature alter metabolism or bring about changes in the diet of the patient. It has been found in people suffering from gastric ulcer.[4] Joyce and Seabrook report its presence in a woman, who, because of a stricture of the rectum, voluntarily placed herself upon a diet high in cereal elements in order to overcome chronic constipation.[5] Nuzum reports two cases of pellagra in individuals suffering from carcinoma of the terminal ileum.[6] Mook and Weiss report pellagra in a vagrant who by force of circumstances was on a rather hit and miss dietary régime, as well as its development in a patient who was on a reducing diet.[7]

From the beginning, chronic alcoholism has been associated as an etiological factor in pellagra. Robichaux[8] reports pellagra in a farmer with an alcoholic history; Klauder and Winkelman[9] in a review of one hundred cases call attention to the part that alcohol plays in pellagra; while Sweitzer[10] in a report of seven cases again emphasizes the striking relationship existing between pellagra and alcoholism. Bethel,[11] Jadassohn,[12] Rossi,[13] and O'Leary[14] also have recognized the association of chronic alcoholism with pellagra.

Alcoholism, with its predisposition to gastro-intestinal disturbance and dietary irregularities, proves a fertile soil for the development of pellagra as illustrated by the following two cases.

The first case is that of an adult white male, aged 46, who was first admitted to the hospital on December 28, 1928, with the diagnosis of delirium tremens and possible beginning alcoholic psychosis. At this time he complained of nervousness and spells of depression.

The patient has led a varied life. At times he was associated with traveling carnivals, a musician in road shows and finally became a sales promoter. He now holds a responsible position with a sales promotion company, but the nature of his work keeps him in intimate contact with bootleggers, soft drink parlors, and the like, with the result that during the past year he has been drinking more heavily than usual and at times would go on prolonged debauches. He stated that he has never been an absolute teetotaler, but that recently he has consumed large quantities of liquor.

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During the week previous to admission he was on a prolonged drunk and in attempting to get off his debauch he became nervous and reported here for treatment. He noticed that for the past several months he was having difficulty in keeping up with his work and that he would have spells of depression. At times he would have crying spells. At this time his appetite was poor and he was troubled with constipation. While on these debauches, he would eat irregularly and often would go without meals. Five years ago he had a fungoid infection of his hands, which disappeared on treatment.

Physical examination revealed a well developed, well nourished white male who was not acutely ill. The only positive finding on examination was that of hyperactive reflexes and no note was made of any eczematous condition being present at this time. The diagnosis of chronic alcoholism with beginning psychosis was made.

He was discharged from the hospital on December 31, 1928, only to be readmitted on January 4, 1929, because of extreme nervousness. On returning home from his first admission he was troubled with insomnia probably as a result of his nervousness. A druggist friend gave him veronal and it is the patient's belief that he may have had an overdose of the medicine because he felt very "dopey." His speech was slurring, but he was well orientated and there was no evidence of dementia found.

Physical examination revealed a bilateral, symmetrical eczema of the dorsum of the hands. The lesions were port wine in color with scattered areas of scaling throughout and extended from the junction of the forearm and the wrist to the metacarpo-phalangeal junction. The patient was placed on routine house diet. For three days the patient's condition remained about the same, after which he became more cheerful and was of great assistance with the ward work. He left the hospital on January 9th with instructions to eat a well balanced diet, to increase his protein intake and to drink plenty of milk. Zinc oxide ointment was given him for his skin lesions.

He reported back to the hospital on January 28. The eczema then had entirely disappeared with the exception of one small area about the size of a dime which was present on the left hand. The patient felt much better, had not been intemperate, and was following out his dietary instructions.

On February 13, 1929, the patient reported, was feeling very well and the small patch of eczema mentioned above was still present and resembled a fungoid condition. The patient stated that he had had this lesion for many years, and that it had not changed any so far as he could remember.

The history of alcoholism in association with the mental depression suffered by the patient and the presence of bilateral symmetrical eczema, warranted a diagnosis of alcoholic pellagra. The disappearance of all symptoms upon the proper dietary régime was a clinical proof that the diagnosis was correct.

The second case is that of an adult white male, aged 50, who was admitted to the dermatological service on December 19, 1928, with a diagnosis of chronic eczema.

For the past two years the patient had indulged in large quantities of moonshine with the result that he had often gone from twenty-four to forty-eight hours without eating a meal. His friends stated that he had not drawn a sober breath since 1926. In September, 1928, he noticed a papular rash developing on both feet. This did not respond to treatment, and in a short time the lesions became vesicular, after which weeping and crusting occurred. The condition spread gradually until it reached an area just above the knees; it then appeared upon the dorsum of his hands and forearms as far as the elbows. Later a patch developed upon his neck. His past history was negative, and there was no serological or clinical evidence of lues. On examination the patient was very apprehensive and had a marked tremor of the hands and arms. A fine tremor was visible about the lips. He was constantly scratching the eczematous areas about his body. There was a crusted, diffuse, papular eruption over the lower extremities more marked over the ankles and legs with a few scattered areas about the thighs. A diffuse scaling eruption was present on the dorsum of the wrists and forearms and was sharply demarcated at the elbows. A patch of crusted eczematous tissue was found on the posterior aspect of the neck. His reflexes were all hyperactive. A diagnosis of impending delirium tremens and chronic eczema was made, and the patient was transferred to the neurological department.

On transfer the history of chronic alcoholism along with the bilateral symmetrical eczema and the associated delirium tremens indicated the diagnosis of alcoholic pellagra.

The patient was placed upon the routine alcoholic régime. The delirium improved and the patient felt quite well. His progress, however, was short-lived, for the suddenly became maniacal and developed various sets of hallucinations and delusions. His mental condition became so bad that he was finally placed in complete restraint.

Shortly before January 6th the patient developed a severe stomatitis. He was no longer able to retain his feedings, and it was evident that the patient was now moribund. On January 6th the fatal diarrhea made its appearance. Its severity gradually increased, and all medications failed in the attempts to check its progression. The patient died on January 18, 1929.

Necropsy examination of thorax and abdomen was done by Dr. Noble, and revealed only a terminal bronchial pneumonia with some congestion of intestinal mucosa. Limitation of the autopsy permit did not allow examination of the central nervous system, which, according to some observers, has a definite pathological picture in the pellagrins.

This exemplifies the typical story of a fatal case of alcoholic pellagra: alcoholism, dermatitis, dementia, diarrhea, and death.

These two cases reveal a definite etiological rôle of alcoholism to the development of pellagra.

BIBLIOGRAPHY

1. Ormsby: Diseases of the skin. 1927.
2. Wheeler, G. A.: Nelson's System of Medicine. Vol. iii.
3. Goldberger, J., Waring, C. H., and Tanner, W. F.: Pellagra prevention by diet among institutional inmates. Public Health Rep., 38, 2361, 1923.
4. Bender, W. L.: Pellagra secondary to lesions of the stomach interfering with nutrition. Jour. Am. Med. Assn., 84, 1250, 1925.
5. Joyce and Seabrook: Stricture of the rectum as an indirect cause of pellagra. Northwest Med., 24, 284, 1925.
6. Nuzum, F. R. Pellagra associated with annular carcinoma of the terminal portion of the ileum. Jour. Am. Med. Assn., 85, 1861, 1925.
7. Mook, W. H., and Weiss, R. S.: Pellagra, two cases. Arch. Derm. and Syph., 12, 649, 1925.
8. Robichaux, E. C.: Pellagra, with report of case. Jour. Missouri Med. Assn., 22, 6, 1925.
9. Klauder, J. V., and Winkelman, N. W.: Pellagra among alcoholic addicts. Jour. Am. Med. Assn., 90, 364, 1928.
10. Sweitzer, S. E.: Pellagra and alcoholism. Minn. Med., II, 719, 1928.
11. Bethel, Geo. E.: Pellagra syndrome as a sequel of chronic alcoholism. Med. Rec. and Ann., 20:364, April, 1927.
12. Jadassohn, J.: The pellagra symptom-complex in alcoholic patients in Switzerland. Korrespondenz Blatt fur Schweizer Aertze, 45:1641, 1915; 46:15, 1916.
13. Rossi, E.: Alcoholism and pellagra. Annali di Neurologia, 36:39-56, 1919-20.
14. O'Leary, P. A.: Secondary types of pellagra. Med. Clin. No. Am. 10, 647, 1926.

ANNUAL MEETING OF THE COUNCIL ON PHARMACY AND CHEMISTRY

Among the subjects of special interest to the medical profession which were considered at the annual meeting of the Council on Pharmacy and Chemistry held April 5 and 6 were: The Board of Trustees having requested that a special committee of the Council be appointed to pass on food products offered for advertising in the publications of the Association, the Council considered plans and methods of procedure for the work of such a committee. The Council discussed the rationality of a preparation combining Type I and Type II pneumococci in a serum for treatment of pneumonia and decided to publish a report on the present status of the serum treatment of pneumonia. The Council considered certain allegations that inferior and unfit ergot is being imported and used for the preparation of the pharmacopeial fluidextract and decided that, in consideration of the lack of evidence for this assertion and the assurances of the government that no inferior ergot had been imported since Sept. 1, 1927, no report was required at this time. The Council asked its referee for scarlet fever immunization products to investigate the present status of such preparations accepted for New and Non-official Remedies and to report on the desirability of retaining or rejecting them. The Council discussed the status of streptococcus preparations for the treatment of rheumatic fever made in accordance with the method of Dr. J. C. Small previously found unacceptable for New and Non-official Remedies, and concluded that, while the products are suitable for controlled investigation, propaganda which invites their use in general is not justified at this time. The Council decided on the publication of a report on the dangers of serum therapy, particularly of protein sensitization. The Council discussed the wisdom of permitting under certain restrictions the advertising to the laity of preparations of liquid petrolatum, of agar products and of similar preparations which act because of their bulk, but postponed action on this question. The Council decided to appoint a committee to report on the desirability and feasibility of the Council's undertaking the work of passing on natural mineral waters. (Jour. A. M. A., April 27, 1929, p. 1430.)

CASE REPORTS

GRADENIGO'S SYNDROME

REPORT OF CASE

HILDING ANDERSON, M.D.
Duluth, Minnesota

Gradenigo's syndrome, which consists of otitis media, unilateral headache and abducens paralysis, all on the same side, has been known for a long time, although the cases reported are comparatively few in number. The accepted explanation, which is probably correct in most cases, is about as follows:

The suppuration of the middle ear extends by one of three or four routes to the tip of the petrous portion of the temporal bone and causes a localized meningitis at that point. The sixth nerve, which crosses the tip of the petrous bone, is involved in and blocked by the inflammatory process. This causes the abducens paralysis. In a similar manner the Gasserian ganglion becomes inflamed and causes the truly severe pain which these sufferers experience in the temporal and parietal regions. The disease may heal spontaneously or may progress to a fatal generalized meningitis.

The routes followed by the infection in its course to the apex are several. It may pass by contiguity through the pneumatic cells of the pyramid bone to the apex; it may follow the petrosal sinuses; it may advance through the internal ear and internal auditory meatus or ductus and saccus endolyphaticus. Other routes are described.

The treatment is surgical, at least if generalized meningitis threatens. A simple mastoid operation is said to be sufficient to effect a cure in the majority of cases. When this operation is not effective, it becomes necessary to drain the abscess at the tip of the temporal bone.

Several routes have been used to reach the tip. If the abscess has ruptured through the bone and lies extradurally, it may sometimes be drained through the middle cranial fossa and sometimes through the posterior. The approach through the middle fossa is under the temporal muscle extradurally along the floor of the fossa toward the Gasserian ganglion (as for an operation on the ganglion). Through the posterior fossa medial to the lateral sinus, drainage may be accomplished medially along the posterior aspect of the petrous bone just inferior to the internal acoustic meatus. The posterior semicircular canal may be destroyed in this procedure. The third mode of attack is to proceed directly through the entire petrous bone until the tip is reached. The posterior and horizontal semicircular canals are destroyed and the internal auditory meatus traversed with probable complete destruction of the vestibular, acoustic and facial nerves.

Our only experience with Gradenigo's syndrome consists in a case which is unusual even for this rare disease. The symptoms and course were typical but the lesion that initiated the meningitis was most atypical. Instead of an extension of suppuration along the petrous bone that attacked the sixth nerve from the lateral side, the lesion found was a small ulcer of the dura over the pars basilaris of the occipital bone on the medial side of the nerve. The lesion was apparently metastatic.

The history follows:

This little twelve year old girl developed earache in the left ear on September 19, 1928. She had been ill in bed with a cold for about a week. She was first seen by us in the home on September 20th, when a paracentesis was done because of a bulging drum. The

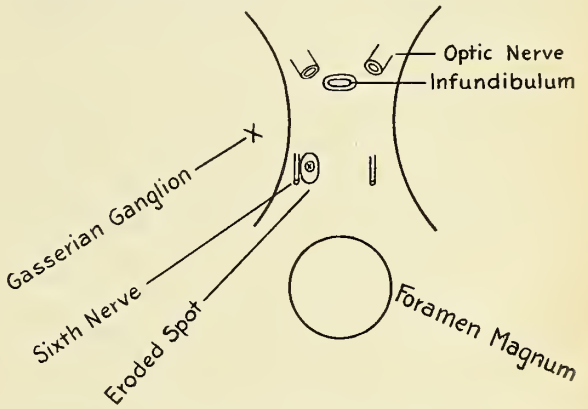

Fig. 1. Position of the eroded spot in the dura medial to the sixth nerve.

drainage following this was scant. Phone calls from the mother were reassuring during the next few days and the patient was not seen again until the fifth day after the onset of the earaché (Sept. 24). On that day she complained of severe headache on the left side. There was no mastoid tenderness and the ear was draining a thin pus, moderate in quantity. There were no other signs of any complication.

She felt much better the following day but on the seventh day complained of double vision. Examination revealed a paralysis of the left abducens and Gradenigo's syndrome with localized meningitis was recognized. A simple mastoid operation was done the same evening. There was no pus, destruction of bone, nor consolidation of the air cells in the mastoid. Only a marked congestion was present. A sample of spinal fluid was taken and found to contain eleven cells.

The cell count on the ninth day was eight. The

child's condition did not improve. Her fever was of the septic type and varied between normal and 104°. It continued this course throughout the entire illness. The abducens paralysis and the severe left sided headache continued. The fundi showed no pathologic change but certain neurologic findings began to develop. The abdominal reflexes were decreased on the right, the Babinski was questionably positive on the same side and there was a slight neck rigidity. The Kernig test was negative.

The pains in the head were very distressing by the eleventh day. The neck rigidity was definite. The functional ear tests showed a marked reduction in both hearing and vestibular function. The spinal fluid pressure was 18 mm. of mercury. The cell count was 266.

It was evident that generalized meningitis was impending. For that reason the tip of the petrous bone was explored through the middle fossa in an attempt to drain the localized inflammation. No pus was found. The dura was incised over the lateral surface of the temporal lobe in order to afford drainage for the excessive cerebrospinal fluid.

There was profuse drainage of fluid through the twelfth day and the child was better. She was not as well on the thirteenth day and the spinal fluid contained more than 300 cells. A new drain was inserted through the dura because the drainage seemed to have stopped.

All the symptoms on the fourteenth day were somewhat more marked—Babinski, Kernig and head pain. The spinal fluid contained 1,250 cells. Another operation was undertaken on the fifteenth day. The posterior surface of the petrous tip was explored through the posterior fossa and the bone itself opened to the internal auditory meatus. Nothing was found and no good accomplished.

The spinal cell count was 1,308 on the sixteenth day. Her progress was steadily downhill from that time on until she died on the eighteenth day (October 7).

At necropsy it was found that there had been a localized meningitis on the medial side of the sixth nerve over the pars basilaris. There was a punched out ulcer through the dura at this point.

In addition to this lesion, the usual results of a generalized, suppurative meningitis was found. There was much pus about the Gasserian ganglion.

The pathologist's sketch shows the location of the lesion in the dura. This could scarcely have been the result of direct extension from the middle ear and mastoid by any of the routes described. It was probably hematogenous.

A very complete discussion of the entire subject of abducens paralysis, giving most of the references in the literature until that time, was made by Sears in 1925.

REFERENCES

Greenfield, S. D.: Arch. Otolaryngol., 9, 171.
Holmgren, Gunnar: Acta Otolaryngologica, IV, 491.
Holmgren, Gunnar: Acta Otolaryngologica, VI, 242.
Sears, Wm. Hardin: Trans. Laryng. Rhin. and Oto. Soc. 1925.

425 Bradley Bldg.

A CLINICAL THERMOMETER AS A FOREIGN BODY IN THE MALE URINARY BLADDER

REPORT OF CASE

E. P. Fenger, M.D.**
C. K. Petter, M.D.
and
Gilbert J. Thomas, M.D., F.A.C.S.*
Minneapolis

This patient was observed at Glen Lake Sanatorium, a county institution for the treatment of tuberculosis. He was a male, aged twenty-two years, who was paroled to the sanatorium from the St. Cloud Reformatory, and, when we saw him, had been under routine care for four months.

He was of low mentality, of the moron class, and had been a lookout for a gang of burglars. He was constantly apprehensive that he might be discharged from the sanatorium, because his former associates had warned him that he would be shot on sight, since his inefficiency as a lookout had caused one of his gang to be killed by the police. He therefore complained constantly of abdominal pain and other symptoms not referable to his pulmonary lesion, which he thought might assure him of a long residence in the sanatorium.

It has been the routine in this institution to take rectal temperatures four times daily, and each patient has a thermometer in his room for this purpose. One morning this man called frantically for the nurse and asked her to call the attending physician immediately, refusing to explain the reason for his distress. This was not an unusual request, but on that occasion he was so persistent in his demands that the house physician was called. When questioned, the patient stated that his thermometer had been lost in his body. No further explanation was given, and the physician naturally supposed that in taking the rectal temperature the thermometer had slipped within the rectum.

Digital palpation and a low proctoscopic examination did not locate the thermometer in the rectum. Fluoroscopic study showed it lying obliquely within the brim of the bony pelvis. By bimanual manipulation it was moved to a transverse position. The patient did not complain of urinary difficulty or bladder irritation. It was determined, following fluoroscopy, that the thermometer had been passed through the urethra and and into the bladder. Because of the patient's advanced pulmonary tuberculosis, and also because of his peculiar mental makeup and difficulty in handling him, it was decided to avoid operation if possible.

After carefully anesthetizing the urethra and introducing a belladonna and opium suppository into the rectum, a cystoscope was passed into the bladder without meeting obstruction. The bladder was over-distended with water and the thermometer was easily seen. Although a rectal thermometer is not quite so long as the

**From the Medical Service, Glen Lake Sanatorium.
*From the Department of Urology and Dermatology, The Nicollet Clinic.

average clinical mouth thermometer, it is a little longer than the transverse diameter of the ordinary male bladder at the trigone. This thermometer was constantly held in a transverse position by the grip of the lateral walls of the bladder. With the finger in the rectum and suprapubic palpation over the bladder, the thermometer was manipulated until the mercury end pointed toward the urethra. Several attempts were made to grasp the end of the thermometer with forceps passed through the cystoscope. The end of the thermometer could be withdrawn to near the inner end of the cystoscope, but no farther, because the ends of the forceps when closed over the thermometer were too large to engage in the inner end of the cystoscope. Some ordinary chewing gum was used on the ends of the grasping forceps in an attempt to engage the mercury end of the thermometer in the cystoscope. Eventually, by this means, the thermometer was pulled down to near the inner end of the cystoscope. In making this manipulation, however, the thermometer was broken. Because of the danger of puncturing the walls of the bladder with the broken ends of glass, the bladder was kept filled with water. A small lithotrite was used to break the glass into small pieces. The bits of thermometer were then washed out through the cystoscope by means of sterile oil and water. The washing was continued until the bladder appeared clear and no mercury or bits of glass could be seen.

The patient had no reaction following the cystoscopic manipulation. *X*-ray examination and cystoscopy were repeated two weeks after the accident and no evidence of cystitis or bits of mercury or glass could be observed.

We believe that if this accident should occur in the ordinary patient, suprapubic cystostomy should be done promptly, in preference to the method used in this case. We think that we were very fortunate in removing the thermometer in this manner without injuring the bladder. In spite of previous difficulty in handling this patient, on this occasion he behaved admirably, which made it possible for us to remove the sharp glass bits without injuring him.

Fig. 1. Thermometer in the urinary bladder.

A somewhat similar case, occurring in a female, was reported by M. L. Levy, in the Journal of the American Medical Association for January 14, 1928.

President's Letter

THE CLEVELAND DISASTER

The entire medical world turns at this time in sorrow and sympathy toward Dr. Crile and his associates—in sorrow for the loss of many valuable lives, and in sympathy to the many bereaved. Few there are who do not know those surviving or have not known some of those who met death in so tragic a way. We are informed that this is the eighth catastrophe of a like nature which has occurred in the United States during the past few years, fortunately none with such an appalling loss of life as in this instance. This occurrence, pathetic as it is, again brings out the salient fact that human nature rises above the stress and shock of the moment and attains heights of grandeur and heroism that make us proud of the fact that we are humans. The courage displayed by those aiding in rescue efforts, fighting an unseen foe, the nature of which they could neither understand nor comprehend, betoken a bravery of spirit and self-sacrifice that challenges our admiration. That the heroism exhibited was not confined to any particular class, race or sex makes it all the more exalting.

There must be some way found to prevent recurrence of such disasters and doubtless out of this will come, after thorough and complete investigation into the causes, the nature of the gases evolved and the rapid and fatal effect upon the victims, a solution and a remedy which for all time will put an end to a fear which must necessarily be engendered in the minds of those who daily duties bring them into contact with *x*-ray films, if indeed these films were the responsible element.

EDITORIAL

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Vol XII June, 1929 No. 6

THE STATE MEETING

The record attendance of 871 at the annual meeting is indicative of its character. Members doubtless took away various impressions of the meeting but the impressions of those who attended the majority of the sessions must have been favorable. Our distinguished guests gave added zest to the meeting without depriving local state talent of the opportunity of appearing on the program.

Registrants who failed to spend considerable time at the scientific exhibit lost a rare opportunity. This feature of the meeting is a relatively new one and it is to be hoped that it is only in its infancy for it was probably the most instructive part of the program.

The subject of the cost of medical care was well handled by those taking part in the symposium.

Dr. Michael Davis of Chicago presented an interesting array of figures representing in a general way the distribution of the cost of medical care in this country. He enumerated the problems which demand solution and his remarks emphasized a subject which is uppermost in the minds of the laity and profession alike. While the per capita cost of sickness is in itself not an alarming figure the real problem to be solved is the uneven distribution of the cost. While the prevention of sickness has been growing in importance, according to his estimate only something over 3 per cent of the grand total expended in this country is in the nature of prevention. Belated and neglected treatment is of course a problem which in all probability will never be completely solved but can only be diminished through education and making medical care reasonably available to everyone.

It was interesting to hear that according to Dr. Davis' estimate about 22 per cent of the grand total of the cost of medical care consists of physicians' fees. An appreciably larger percentage goes to the maintenance of hospitals and clinics and similarly a larger amount is paid out for medicines and medical appliances. Attention was drawn to the fact that the expense of hospitalization and to a large degree that of medication is directed by the medical profession. These items amount to much more than the money squandered on patent medicines and non-medical practitioners, enormous as this amount is. In other words, the profession is in a position to make the cost of medical care higher than it should be.

Dr. Fishbein lived up to his reputation as an entertaining and instructive speaker. He believes, and we agree, that the multiplication of technical procedures in medical practice has already reached the stage where the average in-

dividual cannot receive the benefits of modern medicine without aid of some sort.

None of the speakers has apparently solved the problem.

First news of the disaster which occurred at the Crile hospital and clinic in Cleveland was received during the closing hours of the convention. Reports have been so conflicting as to the cause of the disaster that comments will be deferred until the true situation becomes clear. Words utterly fail when such a catastrophe occurs, but there exists in the heart of each one of us an overflowing sympathy for all those affected by the tragedy.

The full proceedings of the House of Delegates will be published as usual at a later date. Suffice it to say that Duluth was chosen for the next meeting and the following officers for 1930 were elected:

OFFICERS

S. H. Boyer, M.D., President, Duluth.
R. C. Farrish, M.D., First Vice President, Sherburn.
B. J. Branton, M.D., Second Vice President, Willmar.
E. A. Meyerding, M.D.,* Secretary, Saint Paul.
A. G. Schulze, M.D., Treasurer, Saint Paul.

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W. A. Coventry, M.D.,* Ninth District, Duluth.

MEMBERS OF THE HOUSE OF DELEGATES OF THE AMERICAN MEDICAL ASSOCIATION

C. B. Wright, M.D., Delegate, Minneapolis.
J. T. Christison, M.D., Alternate, Saint Paul.

*Re-elected.

HISTORICAL COMMITTEE

Our editor says since we represent a committee of the State Association he thinks he will let us have space again this month. We are glad of it, as we are just beginning to get some kick out of writing this stuff, our first venture in print for a long time.

Yes, the University of Minnesota had a medical faculty long before any teaching was done and before a medical school existed in Saint Paul or Minneapolis. Yes, there was a medical school in Winona also in the early days. We know something about this subject, viz.: Medical Teaching and Schools in Minnesota—but who knows if there were any graduates from the Winona School and who they were?

The American Medical Association has met in Minnesota four times and two men from Minnesota held the office of Vice-President of that Association before most of you were born, and certainly before any of you were practising medicine. We know the answer to this one all right, and we also know that one of the Presidents of our State Association had also been President of the State Medical Association of Wisconsin. We haven't a portrait of him yet, but we hope to get one, as local detectives are on the trail. Before you carefully place this journal aside where you may never see it again, send in something to Dr. H. M. Workman, Tracy, Minn., or if you can not remember the name and address and are too indifferent to look it up, our editor will be glad to forward your contribution.

J. M. A.

INCOME QUESTIONNAIRES

Our members not being greatly interested in determining the professional income of Minnesota physicians as evidenced by the few returned questionnaires, we are calling a halt to the undertaking and will await with interest the outcome of the investigation of the American Medical Association. The latter being national in scope will after all be much more reliable than any state-wide investigation.

PROPHYLAXIS AND TREATMENT OF PERTUSSIS

The use of convalescent serum in the prophylaxis and treatment of whooping cough has been disappointing. Vaccine therapy has been extensively employed. The opinions regarding the effectiveness of the vaccines are greatly at variance. The Council on Pharmacy and Chemistry has not admitted any "mixed" whooping cough vaccine to New and Non-official Remedies. In regard to simple pertussis bacillus vaccine it states that the evidence for its value either for prevention or for treatment is questionable. Drug therapy has fallen into discredit in the treatment of whooping cough. The use of *x*-rays, ultra-violet rays and other light treatment has been tried without convincing results. When the weather permits, the best results are obtained by fresh air treatment. (Jour. A. M. A., April 20, 1929, p. 1374.)

CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*
Minnesota State Medical Association
11 West Summit Avenue
Saint Paul, Minnesota

1. *Question.*—What is the purpose of the Consultation Bureau?

Answer.—This service was established March 22, 1929, by the Committee on Hospitals and Medical Education. Dr. W. A. O'Brien, Assistant Professor of Pathology, University of Minnesota, was placed in charge. A subcommittee was formed to assist Dr. Meyerding and Dr. O'Brien in working out the details of the plan. Any member of the Minnesota State Medical Association may submit questions for answer and an attempt will be made to give an immediate reply. If this is impossible, efforts will be made to make it as prompt as feasible, depending on the nature of the question. Since the opening of the Bureau, the following types of questions have been received:

1. Difficult diagnostic problems
2. Inquiries concerning new drugs
3. Medical legal questions
4. Information concerning good textbooks
5. Opportunities in graduate study

One of the interesting features has been a large number of diagnostic problems submitted. Every one is requested to use the Bureau as much as possible and any member of the State Medical Association may be called on to help out in answering the questions. This is just another example of the trend in medical practice of working together for self-betterment and for better service to our patients.

2. *Question.*—What is the best treatment for whooping cough? What is the best vaccine on the market? I would like to know how to control the symptom of vomiting. Are ether olive oil enemas of value?

Answer.—There is no one best treatment for whooping-cough, as it may be necessary to try several things before the desired effect is obtained. Stock vaccine is just as efficient as autogenous vaccine. Get the combined vaccine, as many believe this to be more efficient than the single organism type. The ether olive oil enemas are very efficient in some cases. Mix one-half ounce of ether in four ounces of olive oil and give one-half ounce of this mixture with a small rectal syringe. This is best given at night, if the cough is troublesome at that time, or it may be given in the daytime as well. Feed solid food as much as possible and if the patient vomits have him eat again. Keep the child out in the fresh air and sunshine as much as possible. Atropin sulphate, four times daily, may also be used to control the spasm.

3. *Question.*—Female, age 27, has had pulmonary and laryngeal tuberculosis for the past year. There is infiltration of both apices, but no evidence of cavity formation. Patient has been doing well up to two weeks ago when she began to cough up bloody mucous. This has persisted to date with a daily average of about three ounces, which is one-third blood. This does not seem to weaken her, but she is very much alarmed about it. I have given emetin, calcium salts, and hemostatic serum without effect.

Answer.—The best form of treatment for pulmonary hemorrhage is absolute rest in bed with the patient flat on the back. The patient should not talk nor attempt to carry on any activity. While the bleeding is going on. The patient should be fed by someone else. Continue this management until about one week after the bleeding stops. A very important thing to remember is to forbid the patient to go to the bathroom. A sedative cough mixture may also be used. Horse serum with its various medications is said to be efficient, but it does not always work. If the patient is restless, some form of sedative should be used. Encourage her by the assurance that pulmonary hemorrhage, while alarming, is not always a serious complication.

4. *Question.*—Female, age 45, complains of a swelling in the deltoid region, which has been coming on gradually for the past two years. There has been more rapid growth in the last three months. Patient complains of pain in the shoulder and arm at times. She fell down the stairs about eight years ago, striking this shoulder. It became black and blue, and she was unable to use the arm for some time. Since then, she has had rheumatism in this region. Tumor is the size and shape of half of a small orange and is not tender. When the arm is passive, the tumor is soft, but when the muscles are contracted, the mass becomes hard and elevated. Radiographic examination shows a tumor of the soft parts. There is apparently no involvement of the bone. The tumor is apparently partially calcified.

Answer.—The most probable diagnosis is encapsulated hematoma. Because of the difficulty in being absolutely certain, it is advisable to do a biopsy. It may be necessary to excise the mass, even if it is found to be benign, because of the pain.

5. *Question.*—I have a patient who has what he calls "calf-itch." His calves have some sort of an itch, and he seems to have contracted it. What is the most probable diagnosis, and what is the treatment?

Answer.—The following conditions should be considered:

1. Ringworm
2. Fungus infection
3. Favus
4. Anthrax
5. An independent lesion

Ringworm is said to be very common in calves but veterinarians inform us that it is very unlikely that the patient has contracted ringworm from this surce. Favus is very rare in this country. Anthrax must be considered, but you did not describe the lesion. Some type of fungus infection is very likely. Perhaps the most important lesion to be considered is the independent affair. Please send us a description of the lesion as this would be very helpful.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

BARRON'S FINANCIAL WEEKLY

April 22, 1929

Two Social Revolutions

Few people realize the revolution in the condition of living which has taken place in the first quarter of the twentieth century. The greatest road builders of all times were the Romans. The Appian Way, ultimately extending 350 miles south from Rome, was started twenty-two centuries ago. It was built with the usual Roman thoroughness, and parts of it still exist. Many of the roads in Britain, and especially the most direct, follow the line laid out by the Roman engineer.

But the automobile knocked the Appian Way to pieces in less than ten years. The rubber tire has compelled the resurfacing of roads all over the civilized world wherever motor traction prevails, as it does increasingly everywhere. There was nothing the matter with the Roman roads for every kind of traffic up to the end of the last century. No horse vehicle at that time was heavier than the Roman chariot, and it is curious that the gauge of the chariot's wheels was exactly the standard gauge of our railroads, four feet eight and a half inches. The marks of those wheels can be traced in one or two of the approaches to the Roman Wall across the north of England.

There is another startling way in which a revolutionary change, fundamental in character, has come about. At the beginning of this century the diagnosis of the physician was largely empirical, based upon experience rather than scientific accuracy. Anyone receiving treatment at a well known clinic is diagnosed by means of *x*-rays, blood pressure, blood and urinary tests, and other records of an accurately scientific character at a minimum cost of a little under $50. Obviously the diagnosis is no longer empirical.

This is true of hospital work generally, and the general practitioner has been largely replaced by the specialist. The result may have been to make such service more costly, but it is incomparably more exact and the vital statistics of the insurance companies show its beneficent effect in increasing the life expectation all along the line, and particularly at middle age, and in the dangerous first year of existence. Taking the United States as a whole, childbirth is three times more costly in life here than it is in Denmark. But we know how improvement can be made. Here are two vital things entering into the life of everybody, and the addition to this country's worth is incalculable in mere figures.

THE FAIRMONT DAILY SENTINEL

April 18, 1929

The doctor at Austin got owly at the Herald because they thought that paper in publishing the news did not sufficiently reverence the rather remarkable ethics of that profession, which pretends to be grossly insulted if they are given publicity, especially if it smacks of advertising. The docs held a caucus and resoluted that the Herald mustn't even mention their names any more. Of course the Herald ignored the gag and just now one of the Austin doctors is in jail awaiting trial for manslaughter for causing the death of a married woman through an illegal operation. The Herald, being a real newspaper, is giving the public all the facts and the medics are chagrinned, if that's spelled correctly.

MISCELLANEOUS

A NURSES' OFFICIAL REGISTRY

Throughout this country, in cities with a population of 100,000 or more, are found well organized and professionally operated nurses' official registries. These registries are operated and maintained by the Registered Nurses' associations in their respective communities. Some registries have memberships of registered nurses only, and others find that they can serve the community better by taking on practical nurses also. In any event, it is the aim of the official registries to supply nurses for their communities according to the need. It does more: The official registry is ever studious about what the future may demand in nursing service, and prepares to meet it. That which makes a nurses' registry official, is the backing and approval given it by the nurses' District, State and National associations, and this name is used in order to distinguish the professional from the commercial.

The Nurses' Official Registry in Minneapolis may be taken as a fair example of those in other communities. The Third District Minnesota State Registered Nurses Association operates and maintains this registry, and in addition to the registry it conducts a service bureau, and an hourly nursing service. These activities are carried on through the Association's executive offices, which are located in the Curtis Hotel.

THE OFFICIAL REGISTRY

The Official Registry has a membership of nine hundred registered nurses, who are qualified and available for private duty in homes or hospitals, in or out of the city. When a hospital in Minneapolis needs a nurse for private duty, it calls the nurse through the registry. Each hospital has the privilege of calling its own graduates regardless of their places on call. Physicians and patients too are granted the privilege of selecting the nurse whom they wish to have for that especial case. When physicians and others call the hospital for a private duty nurse in a home, the hospital usually must call such a nurse through the Nurses' Registry. Anyone may call the registry for a nurse, but a certain amount of information is asked in order to give helpful assistance in securing the right type of nurse for the case, and to be assured that it is not a fictitious call. All cases calling nurses through the Official Registry must be under the care of a physician.

A registered nurse is in charge of the registry operations and she works under the direction of a special committee appointed by the Board of Directors of the Third District, M. S. R. N. A. This committee meets at regular intervals to go over registry business and plan future work.

During 1928 the number of patients who received nursing care through the Nurses' Official Registry totaled 12,644.

In Hospitals	10,370
In Homes	1,877
Out of City	397

THE SERVICE BUREAU

The Service Bureau was created to assist nurses in securing various positions. This Service Bureau aims to find the right person for the position. It is not interested in how many nurses it places in positions, but in how well it has served both nurse and employer.

Nurses who wish positions are required to make written application, give references and name of last employer. The director of the nursing school of which she is a graduate is also called upon for information regarding her work as a student nurse. Her preliminary education and postgraduate experience are also taken into consideration. All this is done in order to help not only to obtain a position for the applicant, but to make the most of all her possibilities. Applicants are encouraged to take postgraduate study and thus be better prepared for certain specialized lines in nursing.

When the request is made for a nurse to take a position in a hospital, doctor's office, or industry, every effort is made to secure one who has the personality, background, education and training which the position requires. A given amount of information regarding the position and what it demands must be obtained by the Service Bureau if it is to serve its clientele well. Hence many questions must be asked of those who make requests for nurses.

HOURLY NURSING

Hourly nursing bridges the gap between private duty nursing and visiting nursing, and it is a response to a long felt need. Physicians, who have had this service for their patients, approve it. The public demands it. It helps to solve the high cost of sickness. Many readers of this article will no doubt find themselves framing questions regarding this new nursing service now available in Minneapolis. Therefore five of the outstanding questions that have been so frequently asked regarding it appear below with their answers.

WHAT is it? It is nursing service by the hour instead of by the day for patients of wealth and moderate means alike, who do not need continuous nursing care.

WHO renders it? A registered nurse.

HOW MUCH will it cost? Two dollars for the first hour and fifty cents for each additional one-half hour or fraction thereof. Service is limited to two hours.

WHEN is it most useful? 1. To anyone ill at home who needs nursing care for a comparatively short period of the day. 2. To provide the physician with a co-worker who gives his patients skilled care in the most economical way; the patient paying only for actual care received and not for unnecessary time spent at the bedside. 3. To enable patients to go home from hospitals when a bath, dressing, hypodermic, or similar treatment is all which may be needed. 4. To assist the new mother until she has recovered her strength; by caring for the infant and gradually teaching the mother to do so. 5. To prepare artificial feeding for infants and to instruct the mother how to prepare it herself. 6. To provide a means of having a nurse in the small apartment or hotel where housing facilities and meals for the nurse have heretofore been a problem.

WHERE can it be obtained? Through the Nurses' Official Registry, Atlantic 3253.

Hourly nursing is both economical and efficient. During the year that it has been in operation in Minneapolis many points of outstanding importance have come to light.

Physicians who have used this service have often remarked on its value. The general practitioner finds it helpful for patients suffering from chronic or acute diseases, whose financial income prevents hospitalization or full time nursing care. For the obstetrician it assures good post-partum care for the mother who was delivered in the home. Also his hospital patients may return home earlier than usual because this service affords good nursing care for both mother and baby and the obstetrician is assured that the instruction which he wishes given to the mother regarding the care of herself and her baby will be carried out. The surgeon's patients who are in need of minimum nursing care after returning to their homes, may now have such care for a small cost. For the pediatrician it means a nurse prepared to give the part time supervision, instruction or nursing care he desires his patients to have.

Patients too have made equally favorable comments regarding the value of hourly nursing, because it has brought to the surgical, medical and obstetrical patient skilled nursing care, when a full time nurse is not needed. Patients chronically ill have greatly appreciated the skilled care that hourly nursing makes possible at so small a cost. The new mother finds it a great boon, for it reassures her through teaching her the care and feeding of her baby. The patients who live in small apartments or hotel rooms find the problem of feeding and housing the nurse solved.

The Nurses' Association in Minneapolis was organized in 1904, with a membership of 50. Distribution of private duty nurses was its chief aim. Today it has a membership of 1,088 and it is constantly reaching out to give more and better nursing service to the public of Minneapolis. In general it may be said that the growth and development of the Nurses' Official Registry in Minneapolis compares most favorably with that of other cities throughout the country.

MARY MARGARET MUCKLEY, R.N.

THE INJECTION TREATMENT OF HEMORRHOIDS

The injection treatment of hemorrhoids was so viciously exploited by quacks that it was frowned on by most physicians. At present the method is used frequently by reputable proctologists. The English school has practised the injection treatment with a 20 per cent solution of phenol in glycerin. J. Boas in Germany has reported 200 cases in which injections with alcohol were made. A solution of quinine hydrochloride and ethylurethane has its ardent advocates. The use of a dextrose solution, injected after a preliminary intradermal procaine hydrochloride injection, is the most painless and probably the safest procedure. In certain cases the injection treatment is inapplicable. (Jour. A. M. A., April 20, 1929, p. 1373.)

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

AMERICAN HEART ASSOCIATION

The scientific session of the American Heart Association will be held in Portland, Oregon, July 9, 1929, during the meeting of the American Medical Association.

HENNEPIN COUNTY MEDICAL SOCIETY

Dr. E. L. Gardner was elected president of the Hennepin County Medical society at the annual dinner held Monday evening, May 6, in the Curtis hotel, Minneapolis. Nearly 500 members of the society attended the dinner, at which officers of the state medical society were principal speakers.

Besides Dr. Gardner, who succeeds Dr. N. O. Pearce, the other officers of the society elected are Dr. S. H. Baxter, first vice president; Dr. Gilbert Thomas, second vice president; Dr. Erling Hansen, secretary-treasurer, and Dr. T. A. Peppard, librarian.

On the new executive committee are Dr. A. S. Hamilton and Dr. F. A. Erb. Dr. Douglas Wood and Dr. H. B. Sweetser were elected to the board of censors and Dr. A. E. Hedback and Dr. W. A. Jones to the board of trustees.

REGIONAL TUBERCULOSIS INSTITUTE

For teachers, physicians, nurses, Christmas Seal volunteer workers, and others interested in tuberculosis and public health work in Minnesota and surrounding states, a regional institute will be held at the University of Minnesota, June 17 to 29, under the auspices of the National Tuberculosis Association, the Minnesota Public Health Association, and the Hennepin County Tuberculosis Association.

The first of its kind to be held in the western part of the United States, the institute will aim to give workers a more comprehensive knowledge of the problems in the tuberculosis field, and to aid in the standardization of methods and programs. One of a series of four to be held in the country this year by the National Tuberculosis Association, it will be directed by Philip P. Jacobs, Ph.D., publicity director of the national organization. Miss Nora Reynolds, director, Child Health Education, National Tuberculosis Association, will take part in the program. Local arrangements will be made by Dr. E. A. Meyerding, St. Paul, executive secretary, Minnesota Public Health Association, and Miss Kathryne Radebaugh, Hennepin County Tuberculosis Association.

An excellent course is promised by the program. It will include child health education, nursing methods, school health work, Christmas Seal sale, and statistical and survey methods. Organization and financial methods, and health programs for local, state, and national work will receive emphasis.

OF GENERAL INTEREST

Dr. G. F. Keller has moved from Mankato to St. Paul.

Dr. Paul B. Cook of Saint Paul has returned from a three months' cruise in the Mediterranean.

Dr. L. R. Boies of Minneapolis is in the East, where he will take a course in postgraduate medicine.

Mrs. Ellen F. Ide, mother of Dr. A. W. Ide of Saint Paul, died at her home in Creston, Iowa, May 2, at the age of eighty-five.

Dr. I. J. Murphy and Dr. S. L. Murphy have equipped laboratories for radiotherapy and diagnosis in the Wesley Temple building, which is nearing completion.

The Blue Earth County Medical Society has just completed a very satisfactory post-graduate course, given at Mankato by the University Extension Division.

The Saint Paul Clinic recently opened their new headquarters at Fifth and St. Peter Streets. Saint Paul. The Clinic formerly had offices in the Lowry building.

Word has been received of the death of Mrs. L. O. Halvorson of Battle Lake, which occurred May 2. Mrs. Halvorson is survived by her husband and three children.

Dr. Clifford E. Henry of Minneapolis was elected Surgeon-General of the Military Order of Foreign Wars at the Triannual convention of the order recently held in New York City.

Dr. L. Dale Huffman, formerly of the Mayo Clinic, Rochester, Minnesota, has announced his association with the Los Angeles Medical Group and Clinic as a specialist in internal medicine.

Dr. C. J. Holman of Mankato has returned from a six weeks' trip to the Western Coast. While there he attended a district meeting of the American College of Surgeons, held at San Diego.

Dr. J. T. Schlesselman, of the Mankato Clinic, has returned from Philadelphia, where he took a three weeks' special course in Bronchoscopy and Esophagoscopy offered by Chevalier Jackson.

Dr. and Mrs. W. A. Fansler and daughter, Miss Jane Fansler, sailed in May for a tour through Austria, France, Germany and other countries of the continent and England. They will return in September.

Dr. W. J. Taylor of Pipestone recently celebrated his eighty-fifth anniversary, which was the occasion for a gathering of friends in the community at his home. Dr. Taylor retired from active practice several years ago.

Dr. and Mrs. Archie Beard of Minneapolis sailed from New York in May for England. They will join the postgraduate assembly European tour of physicians in England and on the continent. They plan to return the middle of July.

Dr. W. A. Fansler of Minneapolis was elected president of the American Proctologic Society at the annual meeting held in Detroit, Michigan, May 13, 14 and 15. Dr. J. K. Anderson of Minneapolis was elected an associate member of the Society. Dr. Fansler is in Europe at the present time and expects to return to his practice some time in September.

Ten health groups will hold a joint convention in Minneapolis September 30 to October 5, 1929. The organizations represented will include: American Public Health Association, American Child Health Association, International Society of Medical Health Officers, American Association of School Physicians, American Social Hygiene Association, the conference of State Sanitary Engineers, the State Sanitary Conference, Minnesota Public Health Association, Minnesota State Organization for Public Health Nursing, and the Northwest Conference for Child Health and Parent Education. Dedication of the public health pavilion at the University of Minnesota will occur during the convention.

POSTGRADUATE COURSE IN TUBERCULOSIS

Individual examination of cases, clinical demonstrations, and discussion of recent progress in treatment of tuberculosis were features of the recent postgraduate course in tuberculosis, held at the state sanatorium, Ah Gwah Ching.

Following the examination of cases, each physician was given opportunity to check his findings with the sanatorium *x*-ray and physical reports on each case.

An evening program given for the patients at the sanatorium by the visiting doctors included talks on various phases of tuberculosis and public health, followed by a question box on tuberculosis.

Eighteen counties were represented by the visiting physicians, many of whom had traveled from distant parts of Minnesota to attend the course. Due to a necessary limiting of the enrollment, many interested physicians throughout the state were unable to attend.

This course was one of a series which have been conducted in the state under the auspices of the Minnesota State Medical Association and the Minnesota Public Health Association, as an important part of the campaign for the early diagnosis of tuberculosis. Additional courses are contemplated, as the success of the plan warrants greater extension and development.

OBITUARY

Horace S. Davis

1855-1929

Dr. Horace S. Davis, aged 74, died May 4, 1929, in Duluth, following an illness that began when he fell January 17 and broke his leg.

Born in Marion, Ohio, May 26, 1855, of Virginia parents, Dr. Davis was educated at the University of Ohio, Columbus, Ohio. He took his medical course at Ann Arbor for two years, then entered Dartmouth, where he was graduated with high honors in 1884. He came to Duluth in 1888 to practise medicine and became one of the most widely known physicians in the city. He took an active part for many years in medical society affairs and had been house physician of the St. Louis hotel for a number of years.

He is survived by two daughters, Mrs. Lair Fess, Toledo, Ohio, whose husband is a son of Simeon Fess, United States senator, and Doris of Duluth, and his widow, also of Duluth.

Dr. Davis was a member of the American Medical Association, the St. Louis County Medical Society and the State Medical Society. He was a member of the Elks and Phi Kappa Psi.

William E. Browning

1873-1929

Dr. William E. Browning, physician and surgeon, owner of the Caledonia hospital, died from a cerebral hemorrhage, at his home in Caledonia, Minn., May 6, 1929. He was 56 years old.

Born in Exeter, Ont., Dr. Browning was graduated at McGill University from the school of medicine and came to Caledonia in 1900. He established a hospital in 1905, and in 1909 founded the present Caledonia hospital.

Dr. Browning was a fellow of the American College of Surgeons, a member of his local and state medical societies and the American Medical Association.

Joseph E. Le Clerc

1868-1929

Dr. Joseph E. Le Clerc, a practising physician in Le Sueur, Minn., for 33 years and widely known in Minnesota American Legion circles, died Thursday, May 9, 1929, of pneumonia. He was 60 years old. Dr. Le Clerc, who was born in Quebec, Canada, came to Minnesota in 1906. He was a veteran of the World War.

COMMITTEE ON STATE HEALTH RELATIONS

The Committee on State Health Relations has agreed to publish such extracts from the minutes of the meetings of the Minnesota State Board of Health from time to time as may be of interest to the medical profession.

Extract from minutes of Minnesota State Board of Health; meeting of Jan. 15, 1929.

The following resolution was adopted:

"WHEREAS, Public drinking fountains have largely replaced the common drinking cup, and are provided in a great many places accessible to the public, and

WHEREAS, Investigations have shown that disease-producing bacteria may be transmitted from one person to another through the use of improperly constructed or improperly operated drinking fountains, and

WHEREAS, The observations made by the State Board of Health have revealed the presence of insanitary types of drinking fountains in many public and semi-public places through the State,

THEREFORE, BE IT RESOLVED, That the attention of the public be drawn to the fact that not all drinking fountains are satisfactory, and that to be sanitary drinking fountains should conform with the following general requirements:

(1) The jet of water emerging from the fountain should be slanting so that discharged water does not fall back onto the orifice,

(2) The orifices from which the water emerges should be protected in such a manner that they cannot be touched by the lips or be contaminated by droppings from the mouth or by splashings from the base beneath the orifices, and

(3) An adequate supply of pure water under sufficient pressure properly controlled, should be provided in order to insure satisfactory operation of the fountain."

Extracts from Reports of Divisions of State Board of Health for the quarter ending March 31, 1929:

Division of Vital Statistics

See Minnesota Medicine, May, 1929, page 299.

Division of Preventable Diseases

UNDULANT FEVER

During the quarter seven cases came under observation.

TULAREMIA

No human cases found during the quarter. One quail was found and proved at autopsy to have suffered from Tularemia. This is thought to be the first report of finding Tularemia in quail and so far as known this is the first instance of the disease in nature in any member of the bird family.

HYMENOLEPIS DIMINUTA

One infant was found to be suffering from infestations with the rat tape worm, Hymenolepis diminuta.

Division of Venereal Diseases

Report of social service work, free drugs distributed to doctors, University Night Clinic and other clinics

and laboratory. During the quarter the laboratory did 11,397 Wassermanns, 2,106 G. C. Smears, 278 Spinal Fluids.

Division of Child Hygiene

The maternal mortality survey is nearly completed. There were five regional conferences for public health nursing. An analysis of public health nursing in Minnesota is given.

The legislature made the following appropriations for the State Board of Health:

	1930	1931
1. Salaries, including vital statistics	$32,700	$34,000
2. Supplies and expense	8,200	8,200
3. Providing free antitoxin and other biologics	7,675	14,575
4. Venereal diseases	17,500	17,500
5. For educational activities in connection with venereal diseases	5,000	5,000
6. Preventable diseases and laboratory	62,000	61,500
7. Sanitary engineering and laboratory	30,000	30,000
8. Protection for maternity and infancy	32,700	33,000
9. Indian health work	10,000	10,000
10. Hotel inspection	28,400	37,000

Ampules Dextrose, U. S. P., 10 Gm., 20 c.c.—Each ampule contains dextrose, U. S. P. (New and Non-official Remedies, 1928, p. 244) 10 Gm., in distilled water, 20 c.c.; buffered with sodium glycerophosphate, 0.03 per cent. Abbott Laboratories, North Chicago.

Ampules Dextrose, U. S. P., 25 Gm., 50 c.c.—Each ampule contains dextrose, U. S. P. (New and Non-official Remedies, 1928, p. 244) 25 Gm., in distilled water, 50 c.c.; buffered with sodium glycerophosphate, 0.03 per cent. Abbott Laboratories, North Chicago.

Pollen Allergen Solutions-Squibb.—In addition to the products listed in New and Non-official Remedies, 1928, p. 31, the following products marketed in 5 c.c. vials, have also been accepted: Dandelion Pollen Allergen Solution-Squibb; English Plantain Pollen Allergen Solution-Squibb; Goldenrod Pollen Allergen Solution-Squibb; Perennial Rye Grass Pollen Allergen Solution-Squibb; Ragweed (Dwarf) Pollen Allergen Solution-Squibb; Ragweed (Giant) Pollen Allergen Solution-Squibb; Red Top Pollen Allergen Solution-Squibb; Russian Thistle Pollen Allergen Solution-Squibb; Sunflower Pollen Allergen Solution-Squibb. E. R. Squibb & Sons, New York.

Pollen Allergen Solutions-Squibb.—5 c.c. vial packages of the following products have also been accepted: Bermuda Grass Pollen Allergen Solution-Squibb; June Grass Pollen Allergen Solution-Squibb; Mugwort Pollen Allergen Solution-Squibb; Orchard Grass Pollen Allergen Solution-Squibb; Sagebrush Pollen Allergen Solution-Squibb; Western Ragweed Pollen Allergen Solution-Squibb. E. R. Squibb & Sons, New York.

Tablets Cinchophen-Abbott, 5 grains.—Each tablet contains cinchophen (New and Non-official Remedies, 1928, p. 123) 5 grains. Abbott Laboratories, North Chicago.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of April 10, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, April 10, 1929. Dinner was served at 7 p. m. and the meeting was called to order at 8 p. m. by the President, Dr. C. N. McCloud. There were 43 members and 2 guests present.

Minutes of the March meeting were read by Dr. E. M. Jones in the absence of Dr. Drake.

Dr. W. A. Jones, Minneapolis, read a memorial of the life of Dr. Charles F. Nootnagel, former member of the Academy. A motion was carried that this be made a part of the permanent records of the Academy and a copy be sent to Dr. Nootnagel's family.

Charles Francis Nootnagel was born in New Holstein, Wisconsin, February 28, 1863. His father, a physician, was intellectual, refined and active. His mother's people were foresters of high rank in Germany. His home training was of the best, and his education in the public schools of Wisconsin and Minnesota proved his ability for he excelled in his work.

He received his medical education at Ann Arbor and Bellevue Hospital Medical College, graduating from the latter March 14, 1887. After two years of busy country practice in Evansville, Minnesota, he located in Minneapolis, where he rapidly developed a large general practice. He was untiring in attendance on his patients; he studied and restudied his cases, and read diligently and in several languages. He spent the year 1895 on the Continent, and spent some time with Professor Von Leube at Wurzburg acting as his special assistant. Professor Von Leube was attracted to the earnest, unassuming worker and urged him to remain as his assistant. While in Wurzburg he saw Professor Roentgen's first experiments with the rays. At the close of his work with Professor Von Leube he toured the Continent, and returned to Minneapolis to resume his practice. Working late into the night in order to accomplish it, he translated Professor Von Leube's Medical Diagnosis, a most valuable volume.

In 1910 he returned to the Continent, giving his attention entirely to the study of pathology and surgery. On his return he soon developed a large surgical practice. Believing that the prime object of a physician is to be of service to suffering humanity, he shirked no professional task, day or night, regardless of weariness or weather, or financial returns. If he saw a possible opportunity to improve in any way, he was sure to add to rather than subtract from what he knew.

Dr. Nootnagel's recreation was found in the woods; he was an expert hunter and woodsman, taking keen delight in the out-of-doors. He was strong, true, and able, self-contained and reserved. His was a great and kindly soul.

Dr. Nootnagel died suddenly on his birthday, February 28, 1929, at his home in Minneapolis, 905 West 48th Street. Surviving him are his wife, a daughter,

Mrs. H. W. Spink of Kansas City, and a son, Philip Cedric Nootnagel, of Fort Bragg, North Carolina.

For many years Doctor Nootnagel had been a member of the Minnesota Academy of Medicine and one of its active workers, a man recognized for his worth and high standing in the profession and for his progressive ideas in medicine, and his loss will be keenly felt by the Academy. He will be greatly missed.

The Committee:
W. A. Jones, M.D.
H. A. H. Bouman, M.D.
J. W. Bell, M.D., Chairman.

The scientific program of the evening was as follows:

Dr. H. E. Robertson (Rochester) gave a talk on "Clinical-Pathological Conferences" and the method of conducting these conferences at the Mayo Clinic.

DISCUSSION

Dr. A. C. Strachauer (Minneapolis): The experimental work of Dr. F. C. Wood at the Crocker Institute, New York, also gives evidence of the resistance of the lung to metastasis following the daily gentle massage of transplanted tumors in rats. The incidence of pulmonary metastasis in the massaged group was very greatly increased over the group of control cancer rats in which the lesion was not massaged. In addition, the rats killed and autopsied fairly early after massage of the lesion showed a very much larger number of cancer cells and metastases in the lungs than in the massaged rats which were killed and autopsied at a later date. The vibratory action of the lung incident to the respiratory function was considered in part responsible for the "non-takes."

Dr. W. F. Braasch (Rochester): Metastases to the lungs with hypernephroma may act differently than the usual metastases. In a case recently reported by Dr. Bumpus the patient had been operated for hypernephroma a year previously and on making a roentgenogram of the chest metastases were visible scattered throughout the lungs. He was given a thorough course of roentgen-ray therapy and the metastases disappeared. A report from the patient a year later states that he is alive and quite well. I do not wish to infer that this would be possible very often, however. As a rule where multiple pulmonary metastases occur with hypernephroma, the patient does not live more than a few months. Metastases with hypernephroma occur most commonly in the lungs. They may cause no clinical symptoms and are overlooked unless roentgenograms of the chest are made routinely with every case of hypernephroma.

Dr. W. F. Braasch (Rochester) gave a talk and showed a large series of *x*-ray films demonstrating "Variations in Type of Duplications of the Renal Pelvis and Ureter."

DISCUSSION

Dr. S. E. Sweitzer (Minneapolis): I have gotten completely out of this sort of work, but Dr. Braasch's presentation is so beautiful that it made me think of the work we did years ago. Apparently we were just on the threshold of urology at that time and we did not know very much about it. Tonight we see this wonderful exposition of the work of Dr. Braasch, and I think he is to be congratulated.

Dr. C. B. Wright: I would like to ask how frequently this anomaly occurs?

Dr. Braasch: I think Dr. Robertson can probably answer that more accurately than I can.

Dr. Robertson: I should guess that in about 1 per cent we have anomalies of the urinary tract, and duplication of the renal pelvis in possibly half of these.

Dr. Braasch: I should guess the same. Pathological complications are observed in possibly 10 or 15 per cent of these.

Dr. J. T. Christison (St. Paul): I would like to ask Dr. Braasch how many of these cases of pyelocystitis we see in children may be due to anomalies of the kidney?

Dr. Braasch: In recent years both urologists and pathologists have demonstrated that anomaly in the urinary tract is quite commonly the cause of chronic urinary infection in children. This is particularly true with infections that do not clear up with the usual treatment.

Dr. A. Schwyzer (St. Paul): This astounding material of duplication of the ureter and kidney pelvis is surely a most pretty demonstration of the subject. Dr. Braasch mentioned that in some cases of duplication of the ureter with hydronephrosis of the upper pelvis a resection of this part of the kidney was done with preservation of the remainder of the kidney. In one case of duplication of the pelvis with hydronephrosis of the upper separate pelvis I was able to make a union between the two pelves through a nephrotomy wound over the convexity of the kidney. The symptoms were relieved by this. Today it is twelve years since that operation and the man is working every day, has had no recurrence of his former pain. Previous to the operation, attacks of severe pain had come on every four to six months for the last three or four years. Whether or not that upper part is functioning, I cannot say.

In another case we had an oval sac at the upper pole of the kidney. It was the size of a goose egg. It was a rarity through the fact that there was no communication between the kidney parenchyma and this upper pelvis. The case was not clear at operation, but the nephrectomy specimen showed that no tubules opened into this sac. The upper one of the two ureter buds thus had failed to find its union with the nephrogenic tissue which forms the glomeruli and the upper portion of the tubules.

Dr. Braasch: Your own Dr. Foley has done a lot of work in the field of anomalies of the urinary tract. Not long ago he described several plastic operations on duplicated kidney and one in particular, namely ureteroureterostomy, was extremely original. Much credit should be given him for his progressive work. I am sorry that he was not here to discuss this paper.

Dr. D. C. Balfour (Rochester) read a paper, illustrated with numerous lantern siles, on "The Problem of Recurring Ulcers."

DISCUSSION

Dr. Gustav Schwyzer (Minneapolis): I am very glad to have seen the illustration of these cases. It will help us a good deal to have received such valuable instruction.

That ulcer of the stomach can occur without any symptoms became clear to me when I saw a postmortem on one of my colleagues years ago where we found an ulcer of the stomach of the size of a half-dollar in a young man who had never complained of any stomach trouble.

This morning I operated on a 70-year old man who had symptoms of duodenal ulcer, loss of weight, severe pain and some obstruction in the pylorus. I wondered when I saw the ulcer if it would indicate to some extent a carcinomatous growth. I examined the liver, pancreas, and the whole abdomen, but there was no trace of any malignancy to be found, so I decided to make a gastroenterostomy. The thought came to me in regard to the so-called graded operation which may come into consideration later on with this same man. I would think, with *x*-ray examination from time to time, we would be able to see whether or not the ulcer is subsiding or increasing or has carcinomatous symptoms. I thought in a man of his age I would do a gastroenterostomy. I would like to consult Dr. Balfour and see what his opinion is in this case.

In 1923 a man came to us with gastric symptoms. *X*-ray showed that he had a duodenal ulcer, with a history 20 years previous to that time. He gave up his work and had gone to a farm, thinking he could remedy his trouble. In 1923 we put him on a diet and he was in the hands of an internist. His teeth were taken care of—in fact, they were all pulled; the tonsils were removed, and the man was getting along fairly well until April, 1926, when he was brought to us in the night with perforation of that ulcer of the duodenum. We closed the ulcer with three purse-string sutures and made an anterior gastro-enterostomy with enteroanastomosis. The patient recovered splendidly and apparently became quite well; he was able to take up his work again as streetcar motorman. Six months later, that is, in October, 1926, he came back with a second perforation—this time from a jejunal ulcer. At that time the rigidity was in the left upper abdominal region. The ulcer was just a little below the "stoma" in the afferent shank of the gastroenterostomy. We excised the ulcer and he made a rapid recovery. He followed his usual ulcer diet again when at home; and we might say here that he is a man who does not smoke nor drink, and follows medical advice to the letter. For two years he was well, but last fall (1928) he again began to have symptoms of stomach distress and a few weeks later, that is, in November, 1928, he came to us with his third perforation—another jejunal ulcer a little above the site of the former one. Now came the question what to do. We figured that by this time the pylorus would be sufficiently open for normal outlet. This could not be determined accurately from the outside. We decided, therefore, to enlarge the ulcer to let the examining finger pass into the stomach and through the pylorus. We found the latter wide enough open to let the end phalanx of the examining finger through. We therefore decided to undo the former gastroenterostomy by excising the "stoma" together with the ulcer. This was done by resection between two clamps, the one on the stomach and the lower one on the proximal and distal shank of the jejunum sufficiently below the ulcer region. The man left the hospital three weeks later and has been feeling well ever since, having gained 26 pounds to date since leaving the hospital, shortly before Christmas, 1928.

It may be of interest to state that the acidity test in December was 72 free HCl and 91 total; while about a half month later, in January, 1929, it was 51 free HCl and 67 total acidity. We have added to his strict ulcer diet a powder which the patient takes after each meal. The powder consists of sodium bicarbonate, magnesium oxide and bismuth subcarbonate.

I would like to hear from Dr. Balfour whether he thinks we were possibly too conservative in the case of the old gentleman mentioned above on whom we did a gastroenterostomy.

Dr. A. T. Mann (Minneapolis): I think we are greatly indebted to Dr. Balfour for the beautifully clear demonstration which he has given. I always greatly enjoy hearing Dr. Balfour because, while he is bold, he is conservative in his boldness and I think he must have fewer things to retract than most men. This has been so beautifully done that there are very few points I should care to go over. There is one suggestion. The secondary operations are quite rare. If they recurred more often than they do, I think possibly we might be tempted to do more anterior gastroenterostomies at the time of the original operation. In going through the mesentery of the transverse colon, in the posterior operation, the area of anastomosis is certainly very close to the vessels which supply the loop of the transverse colon, and it is not always an easy thing to undo that area of adhesion without interfering with the blood supply in some way and possibly inducing a thrombosis in some of those veins afterwards, which might necessitate a rather hasty operation afterwards for the resection of that portion of the bowel not supplied by the normal blood supply.

The other point I want to mention is more one of diagnosis, and that is: I think we sometimes have a great deal of difficulty in throwing out a diagnosis of chronic cholecystitis. In following these cases of chronic cholecystitis, and in the results which we got in the early days of our experience, we found that we couldn't tell whether or not we had a chronic cholecystitis, and I know that a number of our cases had been diagnosed as chronic ulcers and had been run through by different groups of men, and some of them had been run through by two or three groups, and all of them made a diagnosis of ulcer and no ulcer was found. On the other hand, two of our cases demonstrated to be chronic cholecystitis had previously been opened and the gallbladder looked at and the abdomen sewed up, with the feeling that the diagnosis had been wrong—that it had not been a chronic cholecystitis case. One of them I did myself, and the other was done by another man. Both of these patients I operated a second

time two years later. The laboratory findings were of chronic cholecystitis. So, it is not always easy to say whether a case is one of ulcer or one of chronic cholecystitis.

Dr. C. B. Wright (Minneapolis): Every time I hear Dr. Balfour or see him operate, I regret that I am not a gastric surgeon. He makes his work look so simple. I was pleased to hear him emphasize the tendency of ulcers to recur. In the Out-Patient Department of the University and in private practice this tendency for ulcers to recur after any form of treatment, medical or surgical, is constantly brought to our attention. Why do ulcers recur? Is it something in the individual's habits, dietetic or otherwise; or is it in the nervous make-up? Hurst and others have advanced the theory that there are certain individuals predisposed to ulcer, the so-called "ulcer diathesis." It may be that mild infection has not received the attention it deserves as a causative factor in recurrent ulcer.

In this regard, I wish to mention two cases I saw this winter. One of these cases I had treated in 1924 for ulcer with severe hemorrhage. He said he had had ulcer symptoms for forty years before I saw him, without knowing the cause. The result was excellent after his medical treatment, largely, in my opinion, due to the fact that he had the right kind of a wife who was a good cook and who had authority enough to maintain his schedule. He was well up to Christmas of last year, when he developed a severe attack of grippe. Two weeks later his ulcer opened and he had another profuse hemorrhage.

Another man had a gastroenterostomy 25 years ago. He has had several attacks of bleeding since and also attacks of functional obstruction. The last three years, however, he has been well. This winter he had an attack of grippe and in about ten days his ulcer again began to bleed.

Careful investigation of each individual case with the idea in mind of trying to explain the recurrence of ulcer might be of help. More and more emphasis should certainly be placed on the careful follow-up of cases treated either surgically or medically, and the necessity for careful supervision for a long period of time should be impressed on the patient.

Dr. J. F. Hammond (St. Paul): I would like to ask Dr. Balfour in what percentage of duodenal ulcers, when they are diagnosed, would he advice surgical treatment?

Dr. A. R. Colvin (St. Paul): It seemed to me the two points which Dr. Balfour stressed were the healing by medical treatment, and that surgery does not cure as many ulcers as we used to think it did.

I want to report briefly three cases. The two first ones were cases in which I had done a gastroenterostomy 14 and 13 years before respectively. Both patients had a happy time for 13 and 14 years and thought they were cured. Suddenly they almost bled to death, without previous symptoms.

The other case was that of a perforated duodenal ulcer, which I saw about a year ago and operated upon, just suturing the perforation. Just one year later the ulcer perforated in the same place and was sutured, a gastroenterostomy also being made.

While these recurring cases do not deter us from operating for ulcers, in conjunction with the fact that according to Dr. Balfour's statistics just given about 18 per cent get well under medical treatment, a very critical selectiveness of operative cases is called for.

Dr. Strachauer: Dr. Balfour's discussion and presentation of statistics of the poor results following the surgical treatment of ulcer are of the greatest value on account of their reliability. The operative procedure in gastric surgery has been so standardized, comparatively speaking, and is of such magnitude, that it is more important to study the poor results than the successes. However, the results from the surgical treatment of ulcer are outstandingly and eminently successful. It is extremely important that an audience of general practitioners should understand that these unfortunate results are of rare occurrence, and that the great majority of cases are successful. I think Dr. Balfour should give us some statistical evidence to that effect. Having done most of the gastric surgery at the University Hospital, for the past number of years, and based on a rather large experience in this field, I am pleased to be able to state that I know of only two cases of gastro-jejunal ulcer which developed in my series. I think it is important for us to know just how rare these occurrences are.

Dr. C. N. McCloud (St. Paul): I would like to have Dr. Balfour touch upon the question of insurance in these cases if he would. Some years ago the New York Life Insurance Company sent statisticians to make an investigation of operated duodenal ulcer cases. On the basis of their findings given out, the Companies have been led to exercise leniency in these cases. I wondered if later statistics would prove that they were in error.

Dr. Strachauer: In considering the subject of recurrence of ulcer it is extremely important to remember the multiplicity of ulcer; that is, that ulcers in the duodenum and stomach are not infrequently multiple and occasionally co-exist in both organs. These ulcers, particularly those in the posterior wall of the duodenum, may not be palpable, and their presence may be discovered only on the performance of duodenostomy or gastrostomy, or in the specimen after resection. Therefore, some of the so-reported recurrences may be an ulcer that was overlooked at the time of operation.

Dr. Balfour (in closing): In answering Dr. Schwyzer's inquiry about the patient 70 years of age, if the lesion is benign, I would advise nothing further. If there is a suspicion of malignancy the patient or his family should be so advised and secondary operation discussed. The primary purpose, of course, is to relieve the obstruction.

Dr. Mann's remarks on anterior gastroenterostomy I think are very timely. It is a good mechanical opera-

tion and it can always be done when you are forced into something other than posterior gastroenterostomy. The question of cholecystic disease is a difficult problem; and much more difficult when there is an ulcer. The articles which are written on the frequency of cholecystitis with duodenal ulcer can be accepted with some reservations.

In regard to Dr. Wright's remarks, if the medical men would realize that there are a great many of these patients who can be kept comfortable, very much can be accomplished without surgery to keep these patients free of disability. There may be very little disability from a duodenal ulcer. As far as infection is concerned, in activating an ulcer there is a frequent relationship.

Dr. Hammond's question as to the frequency of operation is difficult to answer because some patients are advised to be operated and decline it, and some patients rather over-persuade the surgeon into an operation. A safe figure, I should think, would be about 50 per cent of duodenal ulcers seen are suitable for surgical treatment.

I was glad that Dr. Strachauer answered Dr. Colvin's question. I perhaps should have shown some statistics which have been very conclusive to me, that is the reports given by physicians who describe what degree of relief has been given. I know I looked up a group one time and found that 88 per cent of those physicians had satisfactory results from operation.

Dr. McCloud's question as to life insurance statistics brings up a very important point. Life insurance companies continue to accept patients who have been operated for duodenal ulcer as good risks. The life expectancy of a man who has been operated for duodenal ulcer was rather better than the man on the street; but in gastric ulcer the subsequent death rate was about two and a half times greater than the average population group. So far as I know there has been no change in their attitude on those cases.

Dr. M. S. Henderson (Rochester) read a paper on "Substitution of the Fibula for the Tibia." Lantern slides were shown.

President McCloud: I wish to take this opportunity, on behalf of the members of the Academy, to thank the members of the Rochester group for giving us this most instructive program this evening.

Dr. C. B. Wright (Minneapolis) reported a case of Aortic Aneurysm showing some unusual features. *X*-ray films were shown. (This case will be reported in full at a later date.)

Dr Arnold Schwyzer (St. Paul) demonstrated a portion of stomach resected for carcinoma and of the remnant of this stomach 24 years later as found at autopsy. No recurrence; death from apoplexy.

The meeting adjourned.

Carl B. Drake, M.D.
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:

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THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

MYXEDEMA HEART, WITH THE REPORT OF TWO CASES: Jacob Easton Holzman, M.D., New York City, American Heart Journal, February, 1929. A case is reported of a man 58 years old who presented the typical symptoms of thyroid insufficiency.

In this case the teleoroentgenogram showed an enlargement of the right and left ventricles. The basal metabolism rate was —20%. The electrocardiogram revealed a low voltage in all three leads, a left ventricular preponderance, and notching and prolongation of the Q. R. S. complexes in all leads.

After treatment with thyroid substance there was clinical improvement in the myxedema, but no demonstrable changes were observed either in the *x*-ray outline of the heart or in the electrocardiogram.

The second case reported was that of a young man of 26 years, whose basal metabolism rate was —18%. The electrocardiogram was not taken in this case.

Many electrocardiographic studies have been made in hypothyroidism. Absent P. and T. waves are well known. Widening or notching of the Q. R. S. complexes and negative T. waves have been described. Low voltages are known to occur. All these characteristics usually disappear after thyroid medication.

There are probably two groups of cases of myxedema heart: those which respond to thyroid therapy, and those in which a long standing myxedema and other factors produce permanent changes in the myocardium which do not permit of a response to thyroid medication.

The so-called "myxedema heart" was first recognized by Zondek in 1918. The characteristics features that he described were: enlargement of the right and left ventricles of the heart, slow pulse rate, normal blood pressure and electrocardiographic changes.

In 1925 George Fahr reported the rarity of the condition, and stated that he was able to collect only eight cases. The cases that he reported responded well

to thyroid therapy, and the electrocardiograms became normal.

Sturgess and Whiting administered thyroid gland, 0.13 grms., three times a day for five days. The patient was watched carefully for such untoward signs as loss of weight, increased pulse rate, palpitation, dyspnea, dizziness, nausea, or a feeling of warmth. If these do not appear they continue giving thyroid tablets twice a day, continuing it until the pulse is about 75. Maintenance doses of 0.12 grms. daily are given when a satisfactory basal metabolic rate has been reached. These authors advise a careful watch for these untoward signs because some patients with myxedema have serious cardiac impairment.

The author further states that not all cases reported in the literature are typical examples of myxedema heart, as many authors omit electrocardiographic and *x*-ray studies, and it is thought possible that certain patients were suffering from coronary disease.

Richard Bardon, M.D.

SURGERY

SUPERVISORS:

DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

AN ANATOMICAL AND CLINICAL STUDY OF INFECTION OF THE HAND: R. Russell Best, M.D. (Annals of Surgery, LXXXIX, No. 3, 359-378). The author presents a number of illustrations to give an anatomical conception of where and how the major infections of the hand take place.

In a thenar space infection there is tenderness over the area of the thenar space. This area is usually distended on the palmar surface and usually on the dorsal aspect of the web between the thumb and index finger. Extension of the index finger usually results in pain.

Mid-palmar space infection gives tenderness over this area with or without loss of concavity of the palm. There is pain on extension of the middle, ring and usually the little finger.

Infection of the short tendon sheaths of the index, ring, and middle fingers results in a diffuse swelling and redness of that digit with tenderness limited to the anatomical outline of that sheath. The finger is held in a slightly flexed position and there is excruciating pain on extension. When the blind proximal end of the sheath ruptures into the thenar or mid-palmar space there are the added signs of these space infections.

In infections of the synovial sheath of the flexor longus pollicis there is swelling and redness over the thumb with tenderness over the anatomical outline of the bursa. On extension there is considerable pain and tenderness over the flexor surface of the wrist.

In infection of the ulnar bursa there is swelling and redness of the little finger with excruciating pain on extension. The hand is semiflexed at the wrist; usually all fingers, and oftentimes the thumb, are partially flexed. There is tenderness over the anatomical distribution of the bursa.

Treatment for infections of a tendon sheath or fascial space is incision and drainage. Many times no drainage material is necessary. A large voluminous dressing is applied extending from the hand to a point above the elbow. Hot boric acid solution is used and should be reapplied every two hours. To provide rest in the early stages the arm is splinted on a large pillow. After continuing the wet dressings two to four days the hand is soaked in hot boric solution two to three times a day for about half an hour, followed by dry heat for an hour. While the hand is in the hot soak and under the dry heat, active and passive motions are encouraged.

Return of function in fascial space infection is usually very good but synovial sheath infection can never be expected to reach 100 per cent.

Verne C. Hunt, M.D.

CARCINOMA OF THE MALE URETHRA WITH A TECHNIC OF PENIS EXTIRPATION: C. B. Huggins and Geo. M. Curtis (Surg., Gynec. and Obst. Vol. XLIII, No. 4. Apr., 1929, 544-548). Carcinoma of the male urethra if diagnosed and treated early lends itself to favorable end-results. A survey of the literature shows 110 cases to have been thus far reported. The condition is often associated with chronic infection and the treatment of such infection. The usual lesion is the squamous celled carcinoma with typical pearly-body keratinization. The neoplasm is more commonly situated in the perineal and membranous urethra than in the penile urethra.

The tumor metastasizes late in its course, usually to the inguinal glands.

Difficulty in urination, and infection, are practically always associated with carcinoma of the urethra, and hemorrhage is frequently noted.

For lesions in the anterior third of the urethra simple amputation of the penis should suffice. For urethral carcinoma between this point and the membranous urethra more extensive removal of the penis with perineal implantation of the urethra is indicated. For cavernous lesions, the entire penis with the crura and urethra down to the membranous urethra should be excised. A technic is described for the total removal of the penis.

The authors stress the fact that urethral carcinoma is rather low in the scale of malignancy and is well adapted to surgical treatment, that it is associated with a small percentage of periurethral abscesses and urethral structures, and that biopsy, which should include the urethral mucosa, is the only certain method of diagnosis.

John R. Hand, M.D.

ENTEROSTOMY IN THE TREATMENT OF GENERAL PERITONITIS: Orr and Haden, Kansas City, Kansas (Arch. of Surg., Vol. 18. No. 5, May, 1919, 2159-2166). The authors recall the value of jejunostomy or enterostomy in the treatment of acute intestinal obstruction and review the same treatment in general peritonitis.

There are three main points of view relative to the cause of death in peritonitis:

1. Intestinal toxemia secondary to paresis of the inflamed intestine. Handley supports the above view of Pringle of Dublin, stating: "The proximate cause of death in suppurative peritonitis is intestinal obstruction. The fatal dose of poison is usually absorbed from the intestine above an obstruction and not from the peritoneal cavity." He further adds that peritonitis may be universal and not cause death unless obstruction be present.

2. Hypochloremia and dehydration is the cause upheld by Gatch, Trusler, Wangensteen and Chunn.

3. Absorption from an infected peritoneum. David and Sparks have shown that colon bacilli will pass from the normal peritoneum into the thoracic duct and directly into the blood stream. A plastic exudate retards passage whereas transudate does not. It seems reasonable if bacteria can do this that their toxins might.

Treatment by enterostomy is based on the obstruction part of the picture. The authors add five cases of peritonitis with three deaths to an already small list of reported cases.

In conclusion the main points for consideration were that in doubtful cases of peritonitis enterostomy should be used. If proper technic is used it can do no harm and may do much good. The authors also state that no treatment for peritonitis should be given to the exclusion of large quantities of saline solution to relieve the dehydration and hypochloremia.

CHARLES WILLIAM MAYO, M.D.

EXCISION OF THE THYROID ISTHMUS FOR RELIEF OF PRESSURE: Frank H. Lahey (Surg., Gynec. and Obst., Vol. XLVIII, No. 4, Apr., 1929, 498-500). Thyroiditis is frequently associated with throat infections, involves the entire gland and predisposes to myxedema. Occasionally a feeling of pressure is experienced by the patient with thyroiditis that may be relieved by the excision of the thyroid isthmus.

Patients with carcinoma of the thyroid occasionally develop the sensation of pressure as do patients with thyroiditis. In carcinoma of the thyroid one lobe is usually larger than the other and there may be associated glandular adenopathy. Excision of the thyroid isthmus gives patients with carcinoma of the thyroid relief from pressure symptoms. Removal of the prethyroid muscles allows the gland to lie immediately below the skin, which is an important factor in subsequent x-ray therapy.

JOHN R. HAND, M.D.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
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ROY N. ANDREWS,
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BEHAVIOR PROBLEMS IN CHILDREN UNDER THREE YEARS OF AGE: Margaret E. Fries, M.D. (Arch. of Ped., Vol. XIV, No. 11, November, 1928). When treatment of mind and body go hand in hand, equal emphasis will be placed on both phases of development and the result will be a better balanced child.

For the earliest development of the infant, the feeling of security and protection is essential. This must give way gradually to the feeling of personal achievement, which should be strengthened by encouragement from the family. Only too frequently is the first phase over-emphasized and prolonged.

Essentially, each child will show individual differences in reactions, but there is a similarity in them which serves as a guide to the early recognition of maladjusted behavior, for instance,—crying when left alone, refusing to go to sleep unless the light is lit or the mother stays in the room, being hypercritical about food or refusing to be weaned from the breast or bottle.

Experience has shown that it is advantageous to prepare every child to meet new and difficult situations. A normal child will find it comparatively easy to adjust himself, but one who deviates somewhat from the normal behavior will find it difficult.

Influencing the behavior of a child through direct approach is important, but of greater effect is that produced through a change in attitude of the people surrounding him. A child is sensitive and responds readily to each member of the family and it is therefore essential that they all are in harmony in helping the child to advance.

AN EXPERIMENTAL STUDY OF THE USE OF UNSWEETENED EVAPORATED MILK FOR THE PREPARATION OF INFANT FEEDING FORMULAS: McKim Marriott, M.D., and Ludwig Schoenthal, Dr. Med. (Arch. of Ped. XLVI, No. 3). In the light of our experiences, it is difficult to understand why evaporated milk has not been more extensively used in infant feeding.

A large or tough curd cannot be formed in the stomach or *in vitro* from evaporated milk. This change in the physical properties of the casein is due in part to the heat treatment and in part to the process of homogenization to which the evaporated milk is also

subjected. The protein is more completely digested from heat-treated milk and does not appear as protein curds in the stools.

The lactalbumin is partially denatured by heating but its nutritional value is not impaired. That the protein of evaporated milk is readily available for nutrition has been demonstrated by Willard and Blunt and by Mojonnier.

Heating does not alter the chemical character of the fat of milk but the fat globules are broken up into much finer particles. The sugar of milk is practically unaffected by the heating and evaporating process.

Mineral Constituents: Evaporated milk is at least as good a source of calcium and phosphorus for human nutrition as pasteurized milk. The "buffer value" of evaporated milk closely approximates that of natural milk.

Vitamins: A supplementary supply of the C vitamin must be given in the form of orange or tomato juice as in the case of infants fed on pasteurized or boiled milk.

There was no evidence that the feeding of evaporated milk led to vomiting, distention, colic, diarrhea or loss of appetite. The results of evaporated milk feeding of newly born infants appear to us to indicate that this form of milk is readily digestible and well utilized by very young infants. The development of the infants fed on evaporated milk as evidenced by the time of dentition, sitting alone, walking, and so forth, was normal. They consider the results in the case of these premature infants as possibly the most convincing evidence of the suitability of evaporated milk for infant feeding.

ATROPINE FEVER IN EARLY INFANCY: Park J. White, M.D., St. Louis (Amer. Jour. of Dis. of Children, Vol. XXXVII, No. 4, April, 1929). In certain cases, atropine produces an abrupt rise in temperature, even in average dosage.

Indications for the use of atropine in early infancy: Pyloric stenosis and gastro-enterospasm, commonly miscalled pylorospasm.

Incidence of atropine fever: Four, or 13.8 per cent, of twenty-nine patients in the hospital with bona fide gastro-enterospasm, without parenteral infection, developed fever unquestionably due to the use of atropine. Three, or 9.4 per cent, of thirty-two private patients developed fever due to atropine. None of the twenty-two patients in the hospital with uncomplicated congenital pyloric stenosis, all given atropine, developed fever.

It is interesting that two of the patients in the hospital with uncomplicated gastro-enterospasm developed leukocytosis after the administration of atropine.

The length of time required for the production of fever with atropine seems to vary. The fever usually starts three or four hours after oral or subcutaneous administration—with the peak in from six to eight hours—and disappears after the drug is discontinued.

ROENTGENOLOGY

SUPERVISORS

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RETROPHARYNGEAL ABSCESS: Roy A. Barlow, M.D., Madison (Annals of Otol., Rhinol. and Laryng., 1929, XXXVIII, 1). The occurrence of retropharyngeal abscess is sufficiently frequent to warrant a brief discussion of the condition and a consideration of its characteristics. Wood describes the retropharyngeal collection of lymphatic glands as consisting of two lymphatic glands back of, or under, the pharyngeal mucosa, in front of the aponeurosis of the tendon and vertebral sheaths, and laterally in close relationship to the great vessels of the neck. Various writers have stressed the etiologic importance of otitis media, accessory sinusitis, tonsillitis and the exanthemata. These various centers of infection may cause the suppurative degeneration of the retropharyngeal nodes, but it may be stated broadly that retropharyngeal abscess is most likely due to extension or invasion from upper respiratory infection.

The clinical picture of retropharyngeal abscess is apparently seen most frequently in children of from one to three years of age. The symptoms are those of pharyngeal or post-nasal obstruction. There is difficult breathing; difficulty in swallowing is common, and pain in the ear is frequently noted. The voice or cry simulates a peculiar squawk or brassy sound. The condition of the patient is quite toxic. He usually refuses to lie down, preferring to lie forward or to remain in an upright position. Objectively the patient looks ill. He breathes with mouth open. A large swelling is apparent in one side of the neck. The pharyngeal wall is swollen and bulging forward on one side just behind the anterior pillar. Palpation is most important; if abscess is present there is severe pain to the patient when the examining finger encounters the soft, fluctuating mass.

Treatment is incision, and this surgical interference is done preferably in the hospital. The suction apparatus should be in readiness so that when the abscess is incised longitudinally the pus may be evacuated with the suction. It is well to explore the region with the finger. The massage is instrumental in evacuating residual pus, and in addition the exploration gives the surgeon an idea of the condition of the pharynx. The after-care is simply that of watchfulness to prevent refilling of the cavity. The examiner must bear in mind the similarity of the clinical picture of retropharyngeal abscess to aneurysm of the carotid artery, lymphosarcoma, fibroma and cervical Pott's disease as-

sociated with erosion of the upper cervical vertebra. There is one other condition which, while not identical, should be mentioned, and that is rotary dislocation of the cervical vertebra. In this condition there is a history of trauma.

ARTHUR C. DEAN, M.D., F.A.C.S.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:
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ROENTGEN RAY THERAPY IN CERTAIN FORMS OF LUNG TUBERCULOSIS IN CHILDREN: Bokay, Zoltan, V., M.D. (Jahrbuch fur Kinderheilkunde, vol. lxxiii, 18-29, February, 1929). Bokay reports a series of 29 cases of hilus gland tuberculosis associated in many instances with small areas of pulmonary tuberculosis, which he has treated by roentgen irradiation. The technic of treatment is accurately described. Briefly stated, a dose of 20 to 50 per cent of the human erythema dose was applied through large thoracic areas, the treatment being repeated three or four or five times with four week intervals. Such applications were found to be entirely without dangerous or unpleasant sequelæ. A maximum rise of one to two degrees C. was noted. Nausea or collapse was never encountered.

Of the 29 cases, all improved rapidly. As a rule within two weeks following the irradiation the temperatures had reduced to normal, appetite and color improved. In most cases three treatments, and at most a fourth or fifth, were found necessary to produce a prolonged arrest or cure. Relapse or renewed activity occurred in three instances and again responded to a second course of treatment. Cachectic children or those with more extensive disease processes, were treated with somewhat reduced amounts of irradiation applied at longer intervals. No cases of advanced pulmonary tuberculosis were accepted for treatment.

The author advocates this form of therapy because of the rapid and certain results obtained and because of the great social and economic advantages as contrasted with the prolonged care in sanatoria and hospitals under the usual régime of sun and rest therapy. Individual case histories of the 29 patients are given.

FRANCES A. FORD, M.D.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

A SURGICAL DIAGNOSIS. J. Lewi Donhauser, A.M., M.D., F.A.C.S., Clinical Professor of Surgery, Albany Medical College; Associate Surgeon, Albany Hospital; Attending Surgeon Child's Hospital, Albany. 799 pages. Illus. Price, $10.00. New York: D. Appleton & Co., 1929.

THE TECHNIC OF LOCAL ANESTHESIA. Arthur E. Hertzler, A.M., M.D., PH.D., LL.D., F.A.C.S. Professor of Surgery University of Kansas; Surgeon to the Halstead Hospital, Halstead, Kansas, etc. 284 pages. 4th edition. Illus. Price, $6.00. St. Louis: C. V. Mosby Company, 1928.

THE CLIMACTERIC (The Critical Age). Gregorio Maranon, Professor of Medical Pathology, Madrid General Hospital; Member Royal National Academy of Medicine. Translated by K. S. Stevens. Edited by Carey Culbertson, A.B., M.D., F.A.C.S. 425 pages Illus. Price, $6.50. St. Louis: C. V. Mosby Company, 1929.

TUBERCULOSIS AND HOW TO COMBAT IT. Francis M. Pottenger, A.M., M.D., LL.D., F.A.C.P., Monrovia, Calif. 2nd edition. 275 pages. Price, $2.00. St. Louis: C. V. Mosby Company, 1928.

INJECTION TREATMENT OF INTERNAL HEMORRHOIDS. Marion C. Pruitt, M.D., L.R.C.P., S. (Ed.) F.R.C.S., (Ed.) F.A.C.S., Associate in Surgery, Medical Department, Emory University, etc. 137 pages. Illus. Price, $3.00. St. Louis: C. V. Mosby Company, 1929.

DISEASES OF THE GALLBLADDER AND BILE DUCTS. A book for practitioners and students. Evarts Ambrose Graham, A.B., M.D.; Warren Henry Cole, B.S., M.D.; Glover H. Copher, A.B., M.D.; and Sherwood Moore, M.D. Illustrated with 224 engravings and 8 colored plates. 447 p. Price $8.00. Philadelphia: Lea & Febiger. 1928.

Graham and his collaborators have summed up their knowledge of gallbladder physiology and pathology in their book entitled, "Diseases of the Gallbladder and Bile Ducts." This book is a very complete and fair presentation of the work of themselves and others on this subject.

Half of the book is devoted to the authors' method of radiographic and functional diagnosis of cholecystic disease. The material is presented in as nearly an unbiased manner as is possible for the originators. Emphasis is placed upon the fact that cholecystography reveals the function of the gallbladder at the time the

test is made and the authors make no claims to interpret past history or prognosis by means of the shadows.

For anyone interested in gallbladder disease from the standpoint of the surgeon, internist or radiologist, this is a very valuable book and cannot be too highly recommended. Although Dr. Graham's treatment of cholecystic disease is entirely surgical, no matter at what stage it is discovered, and there is only a bare mention of so-called non-surgical drainage and medical treatment, the internist should be acquainted with all the information contained in this book.

HUGO O. ALTNOW, M.D.

SYPHILIS. Henry F. Hazen, A.M., M.D., Prof. of Dermatology and Syphilology, Medical Department, Georgetown University. Second Edition. 643 pages. Illus. $10.00. St. Louis: C. V. Mosby Co., 1928.

This text treats the subject of syphilis thoroughly. Chapters dealing with the clinical course and manifestations of the disease are well written and concise. Diagnosis and treatment are discussed in considerable detail.

The results of careful study and broad experience are evident in this work.

L. R. CRITCHFIELD, M.D.

THE FIFTH AVENUE HOSPITAL CLINICS. Editorial Board, Milton Raisbeck, M.D., chairman, *et al.* 336 pages. Illus. $5.00. New York: Paul B. Hoeber, Inc., 1927.

This book is attractively arranged, with numerous photographs of the exterior and interior of the hospital scattered through the book.

It consists essentially of short articles based on material presented at the semi-monthly staff meetings of the hospital. There are twenty-six subjects presented. Space does not permit a review of these individual subjects. They include material from the various departments of medicine, surgery, pediatrics, urology, etc.

There are some case reports, and some original articles. The latter deal either with problems in medicine and include reviews of the literature, or in some cases discuss matters of more general interest, such as the Gorgas Memorial and preventive medicine.

There is also a chapter on the management of the Dietary Department with a discussion of various special diets, including infant feeding.

The book is well supplied with illustrations, copies of roentgenograms, diagrams, and tables which make the various articles easy to read and understand.

WARNER OGDEN, M.D.

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Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XII July, 1929 No. 7

PNEUMO-SILICOSIS: WITH REPORT OF A FATAL CASE*

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Minneapolis

THE term pneumoconiosis is applied to changes developing in the lungs after inhalation of any dust in sufficient concentration and for a long enough time to be harmful. When silica is the harmful dust, the affection is called pneumo-silicosis, and it has been known to exist in many industries, especially hard rock mining, for hundreds of years. When complicated or associated with tuberculosis it is known as silico-tuberculosis and is essentially identical with tin or gold miner's phthisis, stone-cutter's phthisis, potter's rot, and grinder's disease. Dusts of lead, mercury or arsenic are actually poisonous, others produce bronchitis, while many, like silica dust, result in lung fibrosis.

The primary factor in the causation of this disease is the entrance of excessive quantities of fine particles of crystalloid silica (from quartz, sandstone or flint) by inhalation into the lymph channels of the lungs. It has been generally believed the real danger lies in the fact that these particles set up little or no irritation when their sharp, knife-like edges penetrate into the lung tissues, and by their insolubility they remain, little or no effort being made on the part of the lungs to expel them. However, this idea is probably not entirely true, as other sharp-edged dusts, such as carborundum, do not easily produce fibrosis. Myers[1] and Mavrogordato[2] found that silica is soluble in weak alkaline solutions similar to body fluids, and in water. Collis[3] has shown that soluble silica injected into the blood stream reacts with liver and kidney cells, causing fibrosis there.

Holdane[4] believes the particles of silica, being inert, fill the cells and slow their life processes by being in the way. Unlike coal dust, which sets up an aseptic catarrh and resulting expulsion of the particles, dust of free silica remains within the "dust cells" (the latter form in large numbers in response to the inhalation of any dust) which die and become clumped together to form masses or pseudo-tubercles. In addition, an increased production of pigmentation takes place. This process occurs first under the pleura, but soon penetrates deeper into the lungs. The nodules become confluent, block the blood vessels and lymphatics, and so finally result in extensive fibrosis of the lung tissue, and corresponding decrease in air space.

Based on animal experimentation by Gardner,[5] no macroscopic lesions could be detected before the seventh month, but microscopic changes were noted after three weeks with beginning fibrosis at about two or three months. No definite statement can be made as to the degree of abundance of particles which is pre-requisite to the development of the disease.

In addition to its specific harmful effect on the lung tissues, pneumo-silicosis, for some unknown reason, greatly facilitates the multiplication of the tubercle bacillus, if this once gains entry to the lymph spaces.

All individuals exposed to silica dust do not develop silicosis, for in 1924 only 176 of 2,302 underground miners on the Rand for ten years or longer, developed it. Why the others did not get it might be explained by the fact that they inhaled less of the dust, or that they escaped the tuberculous infection which acts as an excitant of the disease. But it has been shown that no individual will escape the subsequent development of the disease if the exposure to silica dust is sufficiently intense over a continued period of time. However, it seems that certain ones have an inherent liability to the disease, and will de-

*Read before the Minnesota Society of Internal Medicine, Rochester, Minnesota, Nov. 15, 1928.

velop a progressive condition when comparatively small numbers of silica particles have become imbedded in the lung tissue, even though further exposure to the dust may cease. This is called latent silicosis. Thus, there are two factors which are prerequisite to the development of silicosis: (1) the presence or access of a tuberculosis infection, and (2) the condition of latent silicosis. The latter is difficult to detect and gives no physical signs or symptoms.

There are two clinical forms of silicosis: (1) Simple silicosis, and (2) tuberculosis with silicosis. In the case of the latter, we may have tuberculo-silicosis or silico-tuberculosis, depending on which disease was primary. In races which are especially susceptible to tuberculosis, such as the Negro, tuberculo-silicosis is the predominant type. These cases are not as contagious as ordinary pulmonary tuberculosis. Also, the liability of simple silicosis in European miners to pass into tuberculo-silicosis increases with the age of the silicosis.

Simple silicosis may be divided into three stages. In the first stage, the symptoms are chiefly dyspnea on exertion, reduced chest expansion, increased susceptibility to "colds," and no impaired working capacity or increase in temperature or pulse rate. In the second stage, in addition to an increase in these symptoms, the patient usually shows loss of weight, slight cough and general cyanosis, an appearance of being sick, and decreased capacity for work. In the last stage, the dyspnea and cyanosis are very marked, the pulse rate increases, the cough is more annoying and may be associated with slight expectoration, chest expansion is slight if any, loss of weight more marked, and the heart may become dilated. Death is finally due to anoxemia, or terminal broncho-pneumonia, or both. Loss of appetite and strength, fever, night sweats, and hemoptysis, so common in tuberculosis, are not present in simple silicosis.

X-ray and vital capacity tests should aid in early diagnosis. The latter is reduced in direct proportion to the amount of involvement. The chief *x*-ray findings are, at first, enlarged hilum shadows extending out along the bronchi. Then these shadows become more dense and give a uniform mottled appearance, which finally becomes a diffuse, symmetrical, mottled fibrosis more marked in the lower lobes but filling practically the whole lung field (Fig. 1).

Prognosis is poor after the second stage is reached, as progression seems inevitable even when exposure is removed. Prevention is the most important thing. This is accomplished by frequent periodical examinations of workers exposed to silica dust inhalation, in order to detect

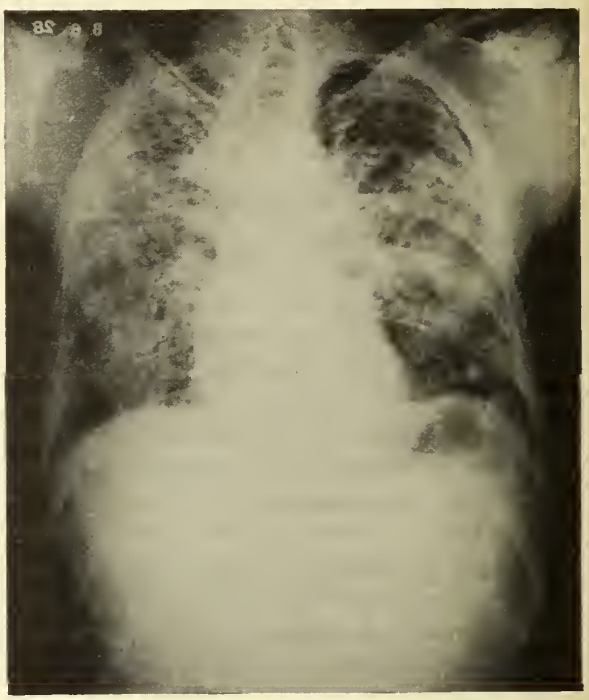

Fig. 1. Photograph of x-ray of lungs in case of pneumosilicosis.

the disease early, eliminating those predisposed to or having pulmonary tuberculosis from this type of work, and improving environmental conditions of workers by better ventilation, the wearing of "gas" masks, etc. Research bureaus[6] for the study of the prevention and cure of pneumosilicosis have been established in many mining districts, notably in South Africa.

The weight of dust and number of particles are the two important factors in determining extent and hazard of breathing silica dust in the air. Of the instruments to determine these factors, the Impinger and Kotze Konimeter are the best according to Sayers.[7] He gives the methods of prevention as follows: (1) Preventing dust from getting into air; (2) removal of dust from the air; (3) replacement of dusty air by clean air; (4) physical examination of workers to determine susceptible ones.

Coal dust is harmful in case of existing silicosis where lymphatic drainage is already blocked,

according to Cummins.[8] The principal occupations in this country where the condition of silicosis in workmen is commonly found, include certain types of mining where silica in its various forms is encountered, quarrying of certain kinds of stones, especially sandstone and granite, and work in industrial establishments where sand blasting or knife-grinding on native sandstone is done. The following case report is an example of the latter.

CASE REPORT

Mr. B. J. N., aged 45, lost his father at the age of sixty-six from apoplexy. His mother died at the age of sixty-nine from jaundice. Three brothers and three sisters are living and well. No history of tuberculosis in the family. He has been married for twenty-four years, and his wife is living and well. His wife gave birth to eight children, six of whom are living and well, two having died from drowning.

Past History: The patient has had measles, mumps, influenza, la grippe, and had a dry pleurisy in 1927, no operations, accidents, or injuries. He had been told that he has had a weak heart for several years.

Social and Occupational History: For the past eight years he has been working in a foundry doing polishing with the sand blower, which exposed him, constantly, during his work, to the inhalation of fine sand.

Present Illness.—The following portion of history was given by Dr. H. W. Reiter of Shakopee, who saw the patient in April, 1927.

"Dr. Reiter stated that at this time the patient had a cough with a slight fever, but that the fever was noticed only on the first occasion and that he had never had any fever since that time. His cough persisted during the summer of 1927. He continued at work during that summer but did not work after that. He worked in a room where there was a large amount of sand dust. The sand was used under high pressure. He had been at this kind of work for the six years of life preceding his final illness. He was seen by Dr. Reiter in October, again in December, 1927, and in February, 1928. Symptoms given by Dr. Reiter were: dry cough, usually nonproductive, no fever, shortness of breath becoming more marked as time went on. He was examined by two physicians in St. Paul, who were said to have made a tentative diagnosis of pulmonary tuberculosis."

The patient came to Thomas Hospital July 12, 1928, complaining of chronic cough, with only slight expectoration. His chief symptom was dyspnea on exertion, which had begun about a year previously but had been increasing in severity so that for the past six months it had been practically impossible for him to do any work. However, he did not stop working until June, 1928. He saw his local physician (who, I believe, was also the Company physician), and was advised to take a rest. He was also told that he had pulmonary tuberculosis and it was because of this that he was sent to Thomas Hospital as a county patient. Aside from weakness and the marked dyspnea on the slightest exertion, he was feeling quite well after quitting his work. In the hospital it was noted that he had a slight morning cough with a small amount of sticky sputum. There was no hemoptysis, night sweats, or pain at any time. His highest weight was 147 and in June, 1928, his weight was 141. Had a good appetite, bowels regular, no urinary symptoms, and gave no history of exposure to tuberculosis or of having had a fever.

Physical Examination.—He was a well nourished male, lying comfortably in bed without noticeable dyspnea, with back rest up about three notches. Eyes, ears, nose, and throat were negative except for cyanosis (definite) of the mucous membrane. The thyroid was normal. Inspection of the chest showed very little expansion on inspiration. The movements of both diaphragms were very slight. Palpation showed an increase in tactile fremitus over both entire lungs, especially the lower half. Percussion showed dullness over both entire lungs, especially the lower two-thirds. Auscultation showed shallow distant breathing of a broncho-vesicular type, associated with fine râles, in abundance, all over both lungs, especially near the bases. These râles did not increase after cough. There was a distinct increase in the transmission of vocal tones, especially the spoken ones, over the entire lungs, especially in the back. The heart was normal in size, shape and position, and no murmurs were heard. Tones were somewhat distant. The second pulmonic tone was definitely accentuated. Blood pressure was 110 over 70. Abdominal examination was entirely negative, as was the remainder of the physical examination. *X*-rays had been taken by Dr. E. Norris of St. Paul three weeks previously, so none were taken at this time.

Laboratory.—Two urine examinations were normal. A blood examination showed a R.B.C. 4,600,000, H.G.B. 75 per cent, W.B.C. 10,500. Four sputum examinations were negative for the tubercle bacillus.

In view of the lack of fever, apparent massive involvement of both lungs, and repeated failures to find the tubercle germ in the sputum, tuberculosis of the lungs was ruled out. In view of the occupational history, marked dyspnea and cyanosis, and clinical findings, a diagnosis of pneumo-silicosis was made.

Course.—During his stay at the hospital his temperature ranged from 98 to 99 and the pulse from 72 to 100. On my visits to see him he complained of nothing but gradual increasing dyspnea which was more noticeable the beginning of the second week at the hospital. On July 22, he complained of some pain in the right leg but no tenderness or edema was noted. On July 23, about 9 o'clock in the morning there was a sudden marked increase in the dyspnea and cyanosis. He complained of more shortness of breath, which increased in severity during the course of the day. His temperature remained normal, but his pulse increased to 120. I saw him again in the afternoon and his condition was much worse. In the morning his lung find-

ings were much the same as before except somewhat exaggerated. In the afternoon, however, the breath sounds were more bronchial and almost tubular in character over both lungs, especially the right. The same râles were present but difficult to hear because of noisy breathing. There seemed to be an increase in dry râles at the bases, suggesting passive congestion. Cyanosis and dyspnea were greatly increased. His condition continued to grow worse during the afternoon. At 7:00 p. m. his temperature was still normal but pulse had climbed to 140. Dyspnea and cyanosis were marked at this time and it was evident he would die. He was expectorating a foamy, bloody sputum and his breathing was noisy and rapid. The lungs seemed almost solid, especially the right one, with bronchial to tubular breathing and many fine, dry, sticky râles all over both lungs. Pulse, dyspnea and cyanosis continued to increase and he died at 1:00 a. m.

Because of the sudden increase in the dyspnea and cyanosis and the cardio-vascular collapse following a recent complaint of pains in the right leg, I felt the sudden death was due to a complicating pulmonary embolism. The lung findings suggested pneumonia more than anything else, but he had no fever.

Medication.—The following medications were given: Adrenalin, morphine and atropine, coramine, nitroglycerine, alpha-lobelin and oxygen without noticeable effect.

Postmortem.—The postmortem was performed by Dr. E. T. Bell, Aug. 14, 1928.

"The body was disinterred for examination. The body is 172 cm. in length, estimated weight 150 pounds, well developed and fairly well nourished. The body has been embalmed. The subcutaneous adipose tissue is 1.5 cm. in thickness over the anterior abdominal wall. There are no external evidences of injury on the body.

The diaphragm is at the fifth interspace on the right, the sixth on the left. The left pleural cavity contains about 200 c.c. of blood-stained fluid, which may be partly from the embalmer's injection. The left lung is somewhat collapsed. There are numerous soft adhesions over the surface of the left lung mesially and posteriorly; there are no strong adhesions. The right pleural cavity contains no excess fluid. There are strong adhesions mesially, soft adhesions elsewhere. The pericardial sac contains no excess of fluid; its surfaces are smooth and clear. The heart is 10.5 cm. in width. The heart weighs 300 grams. There is no enlargement or dilation of any of the chambers. There is no disease of any of the valves or of the mural endocardium. The musculature shows no fibrosis or softening. There is no disease of the coronary arteries or of the root of the aorta.

The right lung weighs 1,050 grams. The entire lower lobe and the anterior half of the upper and middle lobes show marked consolidation. The lung is very firm on palpation but no nodules are palpable. Sections show on the cut surfaces very small islands of lung parenchyma separated by large masses of tissue with a dense fibrous texture and of dark color. The lung is very tough on section and of fibrous character. No pus can be expressed but a little air is found in all parts of the lung. The central and anterior portions of the lung are not well preserved. Portions of the posterior part of the lung sink in water; other sections float deep in water. There are no areas of necrosis

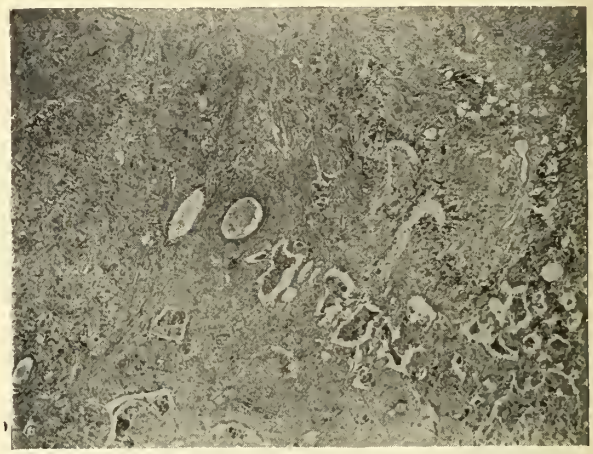

Fig. 2. Photograph showing microscopic view of typical area in lung.

visible and the cut surfaces everywhere have a uniform appearance, showing a large amount of pigmented fibrous tissue and a very small amount of normal lung tissue. There are no cavities in the lung. The bronchial lymph nodes are deeply pigmented and moderately enlarged; they show no necrosis. There is no disease of the pulmonary artery. No changes are noted in the bronchi. The left lung weighs 850 grams, and resembles the right in all respects.

The omentum, intestine, appendix, spleen, liver, gallbladder, pancreas, adrenals, stomach, duodenum and rectum show no evidence of gross disease. The left kidney weighs 120 grams, the right 110 grams. The capsules strip easily. The external surfaces are smooth. No gross changes are noted on the cut surfaces. There are no changes in the pelves or ureters. No gross changes were noted in the bladder, prostate, aorta, lymph nodes of thorax and abdomen, thyroid gland, trachea or larynx. The bones in general, the skull and contents of cranial cavity show no evidence of gross pathology.

Microscopic Examination of the lungs shows enormous amounts of dense fibrous tissue filled with pigmented dust; only small islands of normal alveoli are present, scattered among the masses of dense fibrous tissue. Some of the alveoli contain serum and a few contain some pus cells. (See Fig. 2.)

Diagnoses.—

1. Advanced pulmonary silicosis.
2. Terminal acute pleuritis and pneumonia."

It was evident, after examining the lungs, why the patient was so dyspneic for there were few normally functioning alveoli remaining. In fact,

it surprised me that anyone could live so long with as little air space as he had. The next most striking thing was this great predominance of dense, fibrous tissue which caused the lungs to appear solid. The excessive pigmentation was characteristic also. The pus cells found in some of the alveoli may have been secondary to the infecting, terminal broncho-pneumonia.

CONCLUSION

Cases of pneumo-silicosis may occur in Minnesota in connection with certain foundry work and mining of granite. It is important to diagnose these cases early: first, to prevent exposure to tuberculosis, to which they are especially susceptible; and, second, to prevent extension of the disease to a point where it is incurable.

BIBLIOGRAPHY

1. Myers, W. M.: Solubility of finely divided rock dusts in water, kerosene and alcohol. "Reports of Investigations," Serial 2548, Bureau of Mines, 1923.
2. Mavrogordato, A.: Studies in experimental silicosis and other pneumonokonioses. "Publication of the South African Institution for Medical Research." Johannesburg, South Africa, Mar. 21, 1922, 164.
3. Collis, E. L.: Pneumonokoniosis, A summary of present knowledge. "Proceedings of International Medical Congress on Industrial Accidents and Disease," Amsterdam, Sept., 1925, 473.
4. Holdane, J. S.: The effects of dust inhalation in mines. South Wales Inst. Eng., Dec. 5, 1923, 24.
5. Gardner, LeRoy U.: Studies on the relation of mineral dusts to tuberculosis. Pt. III. The relatively early lesions in experimental pneumonokoniosis produced by carborundum inhalation and their influence on tuberculosis. "Am. Rev. Tuberc." (Mar.-Aug.), 1923, 7:344.
6. Watkins-Pitchford, W.: The silicosis of the South African gold mines, and the changes produced in it by legislative and administrative efforts. "Journal of Industrial Hygiene," 1927, 9:109.
7. Sayers, R. R.: The effects of silica dust upon the lungs. Part II. Am. Jour. Pub. Health, 1927, 17: 348.
8. Cummins, S. L.: Effects of coal dust upon the silicotic lung. Jour. Path. and Bacteriol. of Great Britain and Ireland, 30:615.

AMNIOTIN-SQUIBB (OVARIAN HORMONE-SQUIBB)

The Council on Pharmacy and Chemistry publishes a preliminary report on Amniotin-Squibb and postponed acceptance to await acceptable evidence for the value of the product in ovarian hypofunction in women. The report refers to the preparation of extracts from the ovaries which on injection into spayed rats bring on changes in the vagina characteristic of estrus; that a few investigators have reported that they produce a similar effect in monkeys; and that extracts having similar actions on spayed rats have been prepared from other tissues such as the placenta, the amniotic fluid and even from the urine of pregnant animals, as well as nonpregnant females and normal males. The influence of these extracts on the symptoms of ovarian hypofunction in women has been neither striking nor consistent, but the stage has at least been reached where an extract having the definite effect on the spayed rat and the spayed monkey is sufficiently purified for experimental application. It is reported that the ovarian hormone-Squibb, prepared from the ovary, has been withdrawn from the market, and Squibb & Sons now present Amniotin, prepared from the fetal fluid of cattle. The preparation is to be administered subcutaneously. Amniotin is sufficiently purified and standardized to be used for careful experimental therapy in clear cases of ovarian hypofunction in women. (Jour. A. M. A., May 18, 1929, p. 1678.)

NATIONAL RADIUM EMANATOR AND SAUBERMANN RADIUM EMANATION ACTIVATOR OMITTED FROM N.N.R.

The National Radium Emanator, marketed by the National Radium Products Co., and the Saubermann Radium Emanation Activator, marketed by Radium Limited, are appliances for impregnating drinking water with radon (radium emanation) in dosages ranging from 50,000 to 200,000 mache units in the case of the former, and 10,000 to 100,000 mache units in the case of the latter. The acceptance of both these products expiring with the close of 1928, the firms were asked to submit evidence in favor of their continued inclusion in New and Non-official Remedies. The National Radium Products Co. submitted an advertising circular which was in effect an indirect advertisement to the public and which made claims far in excess of those previously permitted by the Council. Radium Limited failed to respond to requests for the current advertising. In consideration of the claims made for the first apparatus and of the failure of the second firm to submit the present advertising, and because no further acceptable evidence has become available, the Council on Pharmacy and Chemistry voted to omit these products from New and Non-official Remedies and not to accept further apparatus for the activation of drinking water until convincing evidence for the therapeutic value of the internal use of radon becomes available. (Jour. A. M. A., April 6, 1929, p. 1181.)

THE CLINICAL SIGNIFICANCE OF EXTRASYSTOLES*

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Saint Paul

CONSIDERATION of that most common of cardiac arrhythmias, the extrasystole, or, as it is more properly called, the premature contraction, leads one, in spite of the many facts known about it, to the recognition of a surprising confusion of opinion as to the clinical significance of this irregularity. Our attention has been recently called to this subject by the observation of a number of patients in whom foci of infection were provocative causes, and who were relieved by the eradication of such foci. Furthermore, investigation as herein reviewed reveals little consideration of this factor and its probable importance in this connection.

The fact that no other symptom referable to the cardiovascular system brings so many patients to the physician[1] emphasizes the importance of correctly analyzing this arrhythmia. This is especially true in the later age groups in which they more frequently occur. All extrasystoles are due to a hyperirritable state of the myocardium,[2] often local. The causes may be divided into extracardiac and intracardiac.[3] Emotional disturbances,[4] and pressure such as that produced by pregnancy, abdominal tumors and gastric flatulency, are the most common extracardiac causes. These are not serious and when recognized reassurance can be given of their harmless nature. Intracardiac causes may be classified as: (1) Degenerative, those seen in myocardial degeneration; (2) inflammatory, those associated with diseases involving the heart muscle in inflammatory processes, as rheumatic fever;[5] (3) toxemic, those associated with the endogenous myocardial effects of disease[6] as malaria and typhoid fever, and the exogenous toxins as tobacco, coffee,[1] and a variety of drugs,[7, 8] notably digitalis, strophanthus, aconite, barium chloride, potassium salts, alcohol, theophyllin and others, and (4) exhaustive,[9] due to a general physical state or a myocardial exhaustion secondary to valve defects or hypertensive heart disease, occurring with effort,[3] always indicative of myocardial disability, and warranting careful study. Cohn[4] says that they occur more in cardiac patients than noncardiacs, and this if true should serve as an additional challenge to us that these groups be carefully differentiated.

It is not within the scope of this paper to discuss the mechanism of extrasystole production except in so far as its study in an individual case enables us to properly appreciate the underlying etiology through a better understanding of the method of production. Normally, cardiac contractions result from stimuli produced in the sinoauricular node, transmitted over the auricles, and by way of the auriculoventricular node through the Bundle of His and Purkinje fibers constituting the conduction system to the heart muscle. Under circumstances of hyperirritability[2] of any part of the myocardium stimuli arise there which pass over the heart and give rise to contractions unless the heart is in that part of the cycle in which it cannot respond, the refractory period. Since, as will be shown later, it is of real value to determine the point of origin of such stimuli, it behooves us to ascertain the location of the irritable focus, and we are eventually led to the recognition that the only accurate method of such determination is the electrocardiographic.[10] Clinically we know that auricular extrasystoles are less frequently forced upon the consciousness of the individual than the ventricular and are the cause of less complaint, but this is not invariable, and only the galvanometric method is infallible.

The extrasystole, besides being unrecognized by some patients, especially when of the auricular type, produces, more often in the ventricular type, a number of subjective sensations of which the patient complains.[1, 11, 12, 13] "Stops," "turns over," "drops a beat," "intermittent," "surging," "catch in breath," "gripping of throat," are terms called forth by these sensations, which may be associated with precordial distress, faintness or sweating. These are so often associated with other cardiac arrhythmias that the differential diagnosis is important. Without the electrocardiograph this is often impossible[3] and never certain, it being especially true in distinguishing certain cases of auricular fibrillation, sinus arrhythmia and heart block, conditions of different prognostic

*Presented before the Ramsey County Medical Society, St. Paul, March 25, 1929.

significances. Usually the extrasystole is so isolated an arrhythmia that the diagnosis is not difficult, but when extrasystoles occur frequently the diagnosis must often be made by graphic means,[10] and this is very important because of radically different therapeutic procedures indicated in the more serious irregularities.

Of the three types, auricular, ventricular and nodal, the ventricular type occurs about six times as frequently as the auricular,[12] and studies have strongly indicated the greater seriousness of the latter. This is particularly true in studies on hospital patients, a well worked out series by Barker,[14] bringing out the fact that of a series of patients showing auricular extrasystoles as the only symptom referable to the cardiovascular system, 25 per cent died in the hospital as against a total medical mortality of 6 per cent. Of those showing other signs or symptoms of cardiac embarrassment than the premature contraction the mortality was 37.5 per cent as against a mortality of 17 per cent for all heart disease, those showing auricular extrasystoles having much the higher mortality. The nodal type[8] should be classed with the auricular as regards importance and is relatively infrequent in occurrence. Especially in mitral disease are auricular extrasystoles important to recognize because they are not infrequently the precursors[2] of more serious types of irregularity as paroxysmal tachycardia of various types or auricular fibrillation, and call for the institution of definite therapeutic measures.

D'Irsay,[15] in an interesting study, showed that in heart diseases with myocardial changes a majority of ventricular extrasystoles were from multiple foci of origin. Conversely this study also showed that diseases not involving the heart are not associated with multifocal extrasystoles, the presence of which always indicated a graver prognosis.

Crummer[1] believes that in mitral disease extrasystoles add nothing to the severity of the case, but in aortic lesions and chronic adhesive pericarditis they increase the gravity of the situation. However, Strickland-Goodall[2] has observed that the appearance of auricular extrasystoles in a previously normally rhythmic mitral stenosis has often been a sign of danger that paroxysmal tachycardia, auricular flutter or auricular fibrillation are about to set in. These are often due to auricular dilatation and relief of right heart stasis by venesection may stop them. In pneumonia[3] the right ventricular extrasystole is indicative of a tendency to right heart failure, and in aortic disease the commonest arrhythmia is the left ventricular extrasystole due to myocardial fatigue presaging failure. McKenzie[16] says that "apart from the worry and fear it occasions, the extrasystole is of little significance," adding that he did not see the clear significance of them in acute febrile infections, although he had earlier[5] said that there is a great tendency to premature contractions where the myocardium is affected in rheumatic fever. The inconsistency of these statements is quite evident, it being difficult to understand the later ignoring of earlier observations which are amply verified by the clinical experiences of others.

However, focal infection is little alluded to in such discussions and I therefore present the following case history résumés:

Case 1.—C. D., a physician aged 61, has angina pectoris and coronary sclerosis with hypertension, carrying a markedly enlarged heart and T-wave inversion in all leads in the electrocardiogram. A severe and distressing extrasystolic arrhythmia developed with the onset of an acute follicular pharyngitis. This irregularity was gradually relieved with treatment of the local condition and has not returned.

Case 2.—O. L., aged 47, a watchmaker, complained of being easily fatigued and of a skipping of every third or fourth heart beat associated with considerable distress, and periods of two or three days at weekly intervals of diarrhea (two to three loose stools daily). While bacteriologic studies of the stools were not made, the diarrhea was completely relieved by the use of stovarsol .25 gm. three times daily, and at the same time the extrasystoles were markedly diminished. This medication has had to be repeated at intervals during the past eight months, the irregularity increasing in frequency with the return of the diarrhea.

Case 3.—B. L., aged 46, a housewife, complained of precordial oppression, occurring chiefly at night, and found to be associated with missed beats of which she was not conscious. Physical examination revealed the presence of several abscessed teeth, the removal of which was followed by complete relief which has persisted since this was done in October, 1927.

Case 4.—P. K., aged 30, a grain dealer, complained of fatigue, palpitation and faintness at times. He was found to have frequent extrasystoles, often following each beat. Examination revealed septic tonsils, the removal of which was followed by a relief of symptoms, including the irregularity.

Case 5.—J. C. W., aged 60, a clergyman, on feeling flushed on arising one morning, felt of his pulse and

noted an irregularity. This was detected six weeks before he was examined and he had found it present at intervals every day since. Examination revealed a dextrocardia and diseased tonsils in spite of a negative throat history. Removal of the tonsils was followed by an immediate and permanent relief of the arrhythmia.

Case 6.—L. H., aged 19, a student nurse, complained of attacks of rapid heart action, irregularity and associated fatigue. The arrhythmia was extrasystolic in nature and partial relief had been obtained by the use of quinidin sulphate. General examination revealed the presence of a number of abscessed teeth, the removal of which afforded the patient complete relief of her symptoms.

These cases, while forming but a small group, are sufficiently striking to warrant consideration that the arrhythmias may be due to a variety of such focal infections and are all probably toxic in nature. They correspond quite well with the observations of Smith,[17] who, in a study of extrasystoles in thirty-one patients with infections and toxemias outside the heart, found twelve restored to normal by the removal of these influences. Such toxemias by these manifestations show a definite heart muscle effect and whenever occurring should call for a thorough search for foci, realizing that neglect of this may induce a chronic myocardial toxemia later to be demonstrated by the more widely accepted picture of heart muscle disease. They comprise a group to which attention has long been called by Greene,[18] more recently having received wide recognition, especially by Christian.[19] It is felt that the early discovery and eradication of such foci will prove a valuable factor in reducing cardiac morbidity in that group of older heart patients in which age class there has been a progressive increase in mortality from heart disease.

The indicated method of handling these cases is rather well agreed upon.[1, 2, 7, 12] Realizing that the arrhythmia is not in itself serious we nevertheless often find that it leads to the recognition of other evidences of heart damage which must be sought and treated. As a corollary to this, the diagnosis of an extrasystolic arrhythmia carries with it the obligation to satisfactorily explain its presence, the burden of proof resting upon the individual who characterizes it as of little significance. This is especially true when it is recognized that its occurrence in heart disease bears no relation to the amount of damage the heart may have sustained. Smith[12] says that even if isolated and rare it is better to watch the patient over a period of time to be sure of their harmlessness. If following an infection or if multiple or rapidly recurring in type, they are to be regarded as a sign of damage to the heart and a thorough examination is indicated. Thus is seen the necessity of regarding every patient with extrasystoles as a suspect heart case, the advisability of a complete investigation on the part of the physician being emphasized for a thorough understanding of the condition.

Cohn[4] expresses the majority opinion of writers on the subject when he says that the significance of this arrhythmia must be interpreted in the light of the whole clinical picture under consideration.[11] Its occurrence without other evidences of cardiac abnormality should lead to the conclusion of its harmless nature and the patient reassured accordingly, usually without the necessity of treatment. In the group of cases in which the arrhythmia is accounted for on the basis of organic cardiac disease, the treatment directed to the underlying condition will often relieve the extrasystoles, although in cases in which they remain troublesome, even where no organic heart disease can be found, considerable relief and often eradication of the irregularity can be obtained by the use of drugs of quinine derivation, notably quinidine sulphate.

SUMMARY

1. Attention is called to a surprising degree of confusion existing as to the clinical significance of extrasystoles.

2. An etiologic classification of this arrhythmia is given, stressing the importance of its correct analysis in an individual case.

3. A brief review of the mechanism of extrasystolic production is given with an explanation of the clinical significance of analyzing the origin of premature contraction in a patient.

4. The importance of the electrocardiogram in this work is stressed.

5. The clinical significance of the several types of extrasystoles in various conditions is discussed.

6. The problem of focal infection in the production of this arrhythmia is disscussed and illustrated by case reports.

7. The clinical significance of extrasystoles is shown to be reflected in the consensus of opinion of authorities who agree that all patients present-

ing this arrhythmia deserve a careful examination from the cardiac standpoint, realizing that it frequently points the way to the diagnosis of an otherwise obscure heart condition, the recognition of which is of great importance in our present-day efforts to reduce the morbidity and mortality from that group of diseases which heads the list of the causes of death.

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REFERENCES

1. Crummer: Clinical features of heart disease, 1925, 107.
2. Hay, John: Oxford Medicine, 1927, 2:350.
3. Strickland-Goodall, J.: N. Y. Med. Jour., 1922, 155:204.
4. Cohn, A. E.: Nelson Loose-Leaf Med., 4:331.
5. McKenzie, J.: Diseases of heart, 1921, 198.
6. Wilson, R. M.: Early symptoms and treatment of heart disease, 1921, 73.
7. Reid, Wm. D.: Heart in modern practice, 1923, 197.
8. Cowan, John: Diseases of heart, 1914, 129.
9. Schultze, F.: Deutsch. Med. Wchnschr., 50:1357.
10. Neuhof, S.: The heart, 1923, 130.
11. Price, F. W.: Disease of the heart, 1918, 169.
12. Smith, C.: Heart affection, 1920, 136.
13. Lambert, Alex: Practice of medicine, 6:339.
14. Barker, Paul S.: Ann. Int. Med., 2:371.
15. D'Irsay: Am. Jour. Med. Sci., July, 1927, 96.
16. Mackenzie, J.: Principles of diagnosis and treatment in heart affections, 1923, 107.
17. Smith, A. L.: Neb. State Med. Jour., 103:78.
18. Greene, Charles Lyman: Minn. Med., 10:538.
19. Christian, H. A.: Jour. Am. Med. Assn., 91:549.

ACCIDENTS WITH LOCAL ANESTHETICS

The investigation of accidents following the use of local anesthetics instituted by the Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the American Medical Association has had many practical results. The reports were published in 1920 and 1924; now, André Klotz of the Strasbourg Hospital has published the results of an extensive study of the literature on this subject. He agrees with the American committees that accidents are due mainly to overdosage, to injections of cocaine, to the use of solutions of too high concentration, to excessive doses of epinephrine, and a smaller number to peculiar conditions of the patient that are beyond evaluation by the physician. The investigations of the American committees and of Klotz have thrown much light on the causes of avoidable accidents with local anesthetics, but it is obvious that many surgeons continue to disregard the warnings that have been published. The report of Klotz emphasizes the importance that physicians should continue to coöperate with the Permanent Committee for the Study of Toxic Effects of Local Anesthetics of the Therapeutic Research Committee. (Jour. A. M. A., May 18, 1929, p. 1680.)

PRESCRIPTION OF REMEDIES IN ACCORDANCE WITH ETHICS

The Principles of Medical Ethics of the American Medical Association contains the following with regard to the prescribing of medicines: " . . . it is . . . unethical to prescribe or dispense secret medicines or other secret remedial agents, or manufacture or promote their use in any way." It contains no provisions holding it unethical to prescribe proprietary medicinal preparations of declared known composition. If physicians will limit their prescribing to the medicinal products included in the United States Pharmacopeia, the National Formulary, and New and Non-official Remedies, they may be confident that they are not prescribing secret remedies; they should be mindful, however, that the National Formulary contains many drugs and drug mixtures that are practically worthless, and that preparations in New and Non-official Remedies are new, and, though worthy of trial, are in some instances still more or less in the experimental stage. For a guide to prescribing, the Epitome of the U. S. Pharmacopeia and National Formulary, and New and Non-official Remedies are to be recommended. (Jour. A. M. A., May 18, 1929, p. 1697.)

IODODERMA AND BROMODERMA*

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IODIDES and bromides are so widely used, both in combination and individually, that an eruption resulting from them is common. Every physician is familiar with iodide or bromide acne. But occasionally eruptions of a bizarre character and unusual distribution are observed. These have all been described but are seemingly so uncommon in the general clinician's experience that they are seldom recognized. Misinterpretation of these lesions often leads to much unnecessary annoyance and even suffering.

REPORT OF CASES

Case 1.—A woman aged twenty-three years was seen in June, 1918. She had taken bromides periodically for epilepsy which had begun at the age of seventeen years. There was much punctate scarring over the seborrheic areas and over the extremities, probably resulting in part from former acne and in part from involuted bromide pustules. On the lower parts of the legs were large plaques and many small, discrete pustules (Fig. 1). The plaques had elevated borders which exuded pus freely and were in part distinctly verrucous. The zone within the border consisted of a thick, dirty-brown adherent crust, and in the center was a superficial scar. Under local antiseptic dressings and an application or two of roentgen ray, involution of the lesions took place in about a month.

Case 2.—A woman aged twenty years was seen in May, 1919. She did not give a definite history of having taken bromides, but she had taken various "medicines" for about six months. There were grouped pustules along the border of the hair on the forehead (Fig. 2), but lesions were not present on the face. There were livid macules and a few pustules on the extremities. The urine contained bromides. Involution of the lesions promptly took place when the medicines were discontinued.

Case 3.—A man aged forty-four years was seen in January, 1921. He had taken a patent medicine as a "blood purifier" for about two weeks. Fungating lesions were present on the cheeks and neck (Fig. 3), nodular in type, with much edema and covered with yellowish vesicles. There was oozing and crusting of some of the lesions and there was superficial ulceration of some of the lesions on the neck. Iodides or bromides could not be demonstrated in the urine, but there was a positive reaction to the intradermal iodine test. Involution of the lesions took place in a week under mild antiseptic dressings, catharsis, and an abundance of fluids.

Case 4.—A man aged thirty-five years was seen in February, 1921. For about three weeks he had been given potassium iodide for possible syphilis with hypertension. An eruption closely resembling pompholyx had appeared on the hands and fingers (Fig. 4). Hyperhidrosis was not associated, and the lesions promptly subsided when the iodides were stopped. The patient had had similar eruptions on other occasions when he had taken iodides.

Fig. 1. Typical patch of fungating bromoderma with discrete pustules.

Case 5.—A woman aged fifty-five years had been taking a patent preparation known to contain bromides every night for two years. A year and a half before she was seen at the clinic, a small lesion had developed on the right leg. This gradually had spread, new lesions developing simultaneously. The lesions had begun as small pustules. She presented a crusted lesion, with a verrucous border, and in part a cribriform superficial ulceration. There was rapid improvement when the bromides were discontinued but the subsequent course is not known. Bromides were demonstrated to be present in the scales and crusts of the lesions.

*From the Section on Dermatology and Syphilology, The Mayo Clinic, Rochester, Minn. Submitted for publication April 15, 1929.

Fig. 2. Grouped pustules on forehead.

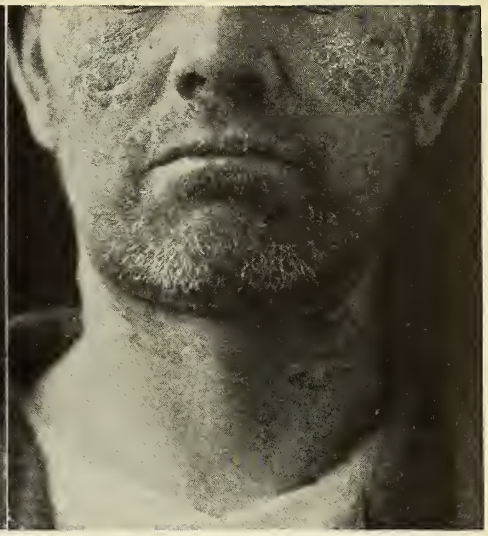

Fig. 3. Fungating lesions with yellowish vesicles on cheeks and neck.

Fig. 4. An eruption resembling pompholyx following the administration of iodides.

Fig. 5. The distribution and configuration may be noted.

Case 6.—A woman aged thirty-two years was seen in November, 1924. She had taken a preparation containing iodides for asthma, in July, 1922, following which the first attack had occurred, only to subside rapidly when the iodides had been discontinued. A second attack had occurred in October, 1923, following the use of iodides, and this also had subsided rapidly on their discontinuance. In the course of a third attack the patient was seen at the clinic, but a history of the use of iodides could not be obtained. The eruption

consisted of yellowish vesicles with a marked inflammatory base; some of them had an annular configuration. They were distributed over the face, on the neck anteriorly and posteriorly, over the upper portion of the back, and on the posterior aspects of the forearms, hands, and fingers. There was marked superficial scarring, especially on the face, probably resulting from former attacks (Fig. 5). Following administration of small doses of iodides, to test out the patient's sensitiveness, new vesicular lesions appeared promptly, accompanied by burning and stinging sensations similar to those which had preceded the appearance of lesions in previous attacks. One specimen of urine examined did not contain iodides. Following the discontinuance of the iodides the lesions rapidly improved.

Fig. 6. Lesions which resembled nodulo-ulcerative syphilide

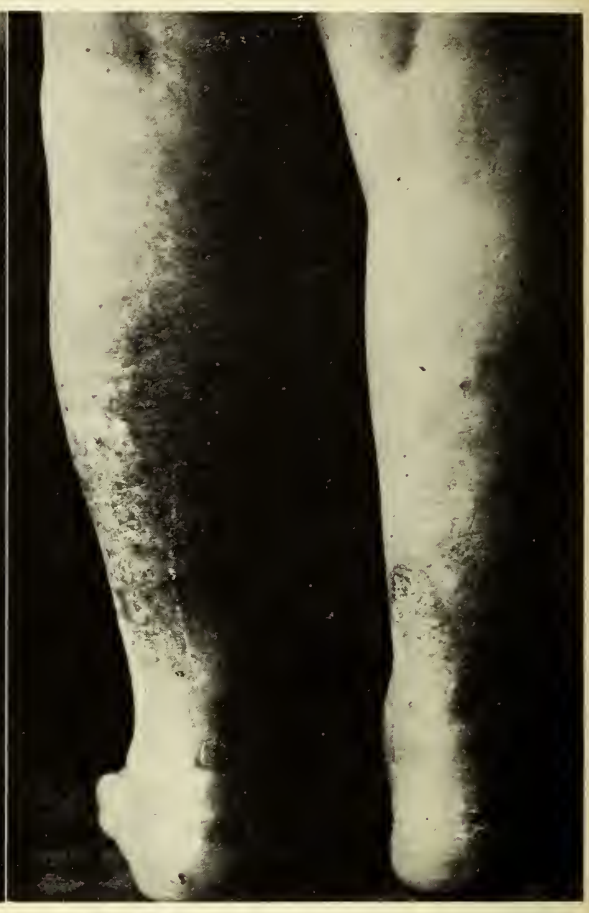

Fig. 7. Lesion resembling nodulo-ulcerative syphilide.

Case 7.—A woman aged sixty-six years had been taking various medicines, none of them definitely known to contain bromides or iodides. The lesions had appeared about two years before she was seen at the clinic; old lesions had been undergoing involution while the new lesions had been appearing. The appearance of the lesions was extraordinary, as it seemed that the process was entirely a superficial ulceration and nowhere was there any evidence of pustulation. The discharge was of a sero-sanguineous character and apparently not that produced by pustular lesions. More than one examiner believed the process to be a nodulo-ulcerative syphilide, especially since the lesions had an arciform border in addition to the other characteristics (Figs. 6 and 7). Examination of the urine for iodides and bromides gave negative results. Bromides were given as a therapeutic test, but a reaction did not occur. A small dose of iodides was given at 12 o'clock noon. Three hours later the patient began to complain of pains identical with those she had noticed in the past, before the appearance of an eruption. Many pustules appeared over a period of about two hours, but apparent reaction in the old lesions was not observed. Other new lesions continued to appear within the next twelve hours. After discontinuance of all iodides, the lesions began to involute rather rapidly.

Case 8.—A man aged forty-nine years had been four months before he was seen in January, 1928, taking bromides for epilepsy for eighteen years. About "boils" had developed. Some of these had become crusted and had discharged pus. The lesions were quite characteristic for bromoderma and healed rapidly when the bromides were discontinued. The most interesting

feature about the case was the appearance of bromoderma eighteen years after the more or less regular use of bromides was begun.

Case 9.—A woman aged sixty years had been taking a mixture containing bromides for nervousness for about a year when the first lesion had appeared on her leg. This lesion had persisted and it spread. The lesion was quite typical for bromoderma, but because of its somewhat unusual behavior biopsy was carried out, in May, 1927. The most interesting feature about this case was the cellular change suggesting a low grade of malignancy (Fig. 8). On discontinuance of the bromides the lesion healed, although somewhat slowly.

Case 10.—A woman aged thirty-two years was first seen in August, 1927. She had been taking medicine for nervousness for about six weeks. Two weeks before she had come to the clinic, the eruption had appeared and had persisted even on discontinuance of the medicine (Fig. 9). The lesions underwent involution very slowly when she was on a regimen consisting of a high intake of sodium chloride and intravenous administration of solution of sodium chloride. A few active lesions still were present three months after the patient was first seen. The urine was repeatedly positive for bromides.

Fig. 8. Proliferation of epidermal epithelium suggesting epithelioma.

Case 11.—A woman aged thirty-two years was first seen in November, 1927. She had been taking hyoscine hydrobromide for four years for the residuum of encephalitis and had been taking a patent preparation containing bromides for about a year. The eruption had begun to appear about a year before she came to the clinic. It had rather a classical appearance and was

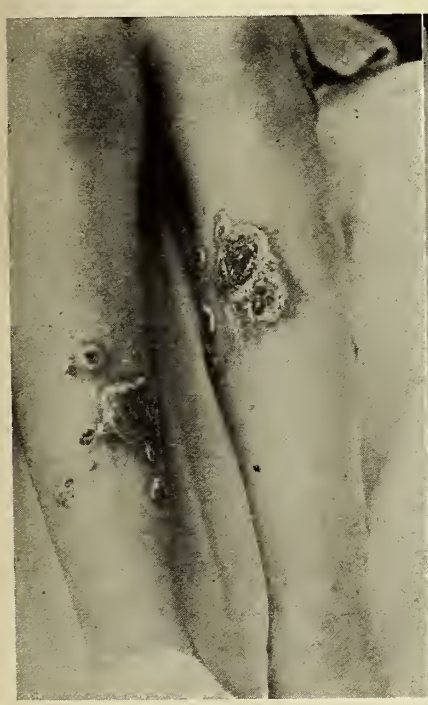

Fig. 9. A classical fungating bromoderma. The verrucous border, cribriform center and discrete satellite pustules are shown.

Fig. 10. Extensive fungating bromoderma.

Fig. 11. Same case as that shown in Figure 10.

extensive (Figs. 10 and 11). The urine contained bromides. Improvement was rapid on discontinuance of bromides and the administration of solution of sodium chloride intravenously.

Case 12.—A woman aged thirty-eight years was first seen in November, 1928. She had been taking various medicines for years. Verrucous lesions were present

Fig. 12. Erythema nodosum type of bromoderma or iododerma.

on the arms and legs which were typical for either iododerma or bromoderma. The striking feature, however, was the nodose lesions on the legs and arms (Fig. 12). The urine contained both iodides and bromides. When all medicines were stopped the nodose lesions underwent involution in about a week; the other lesions persisted longer. It is probable that the nodose lesions, although they resembled erythema nodosum very closely, were the result of ingestion of drugs. Whether the disorder was due to iodides or to bromides could not be determined in this case.

COMMENT

Clinical data.—The photographs and the descriptions of cases demonstrate that various types of iododerma and bromoderma vary much in the gross. Yet there are characteristics that distinguish them from other lesions, even if these are not always readily detected. It is a striking fact that these two representatives of the halogen group can produce lesions on the skin that are identical in all respects so that it is not possible to differentiate them by their appearance. These somewhat bizarre lesions have been referred to as verrucous, vegetating, tuberose, and nodose iododerma and bromoderma. The elementary lesion is usually a pustule and the unusual lesions are the result of aggregated pustules with secondary changes, except in the true nodose type, which presents nodules similar to those seen in erythema nodosum. It is usually possible to find at least a part of the lesions showing a warty appearance; the remainder is a crust of inspissated serum and pus and some secondary scarring. The cutaneous lesions for which these drug eruptions are most easily mistaken are tuberculosis verrucosa cutis, blastomycosis, dermatitis vegetans, pemphigus vegetans, syphilis, and occasionally carcinoma. The verrucous element is common to all these lesions, but when in addition a discrete pustule is found close to the larger lesion the evidence points strongly to a drug as the cause. The distribution of the lesions is not characteristic, but they have a tendency to predominate on the legs. Especially is this true of bromoderma. This is evident in the cases reported here.

The final diagnosis, however, usually will have to be made by collateral evidence. Once the suspicion is aroused of a possible drug eruption, all medication should be stopped. New lesions may appear, however, for several days and the older lesions may not show tangible change for weeks after the offending drug has been stopped. Bromides or iodides found in the urine may be considered significant, but these drugs may have been administered without actually being the cause of the eruption. The absence of these chemicals in the urine is not evidence that a drug is not the cause of the eruption. Demonstration of these chemicals in the scales and crusts of the lesions can be accomplished only with great difficulty, as the amounts of them must be infinitesimal in the material obtained. It was possible to demonstrate the drugs chemically in case 5 of the series reported here. If the diagnosis cannot be clinched otherwise, it may be necessary to give one or both of the chemicals as a therapeutic test. A small dose will produce an exacerbation in and congestion of the lesions; often this is associated with the appearance of new lesions and with sensations of pain and heat in the lesions, or at the site of new lesions.

It seems to be a fact that the drugs must be taken over a long period of time, usually a period

of months or even of years, before these bizarre eruptions make their appearance. This is in contrast to the acneform eruptions so commonly seen as the result of the administration of these drugs. In case 8 the patient had been taking bromides for eighteen years before their was any skin trouble.

Antipyrin and arsenic, among other drugs, have been recommended as antidotes, but apparently they have never gained much popularity. It may be seen why it would not be wise to administer these drugs over a long period merely as an antidote. I have given arsenic a trial in selected cases, but did not find it particularly efficient as a preventive. Apparently a patient who has once passed through an attack of bromoderma or iododerma occasionally is subsequently immune. It has been claimed that patients can sometimes be desensitized by gradually increasing doses.

The treatment of these eruptions resolves itself primarily into proper recognition of their etiology and removal of the offending agent. The lesions are occasionally found to be so troublesome that considerable nursing and medical attention is necessary. In the severe form, rest in bed, cathartics and increased administration of fluids are desirable. Local, mildly antiseptic wet dressings, such as potassium permanganate and boric acid, seem desirable. When the fungating lesions have begun to dry, gentle removal of the crusts and other debris by curettage seems to enhance involution. Occasionally the lesions are so painful that an anodyne becomes necessary. For the pain I have also found one or two treatments with unfiltered roentgen rays, a fourth to a half of a skin unit dose, desirable. This, at the same time, seems to have a definite drying effect on the lesions. Wile* has recommended intravenous injection of sodium chloride.

Histopathology.—There is nothing characteristic about the microscopic picture. There is usually a tremendous infiltrate consisting of polymorphonuclear leukocytes. Often small abcesses are formed within this infiltrate or its surrounding tissue. The vessels are dilated and filled with leukocytes. One of the interesting and important features of the type of case under discussion is the extraordinary proliferation of the epidermal epithelium; often this is present to such a degree, and has such an atypical character, that malignancy is suspected (Fig. 8). The rete pegs sprout in all directions into the cutis, sometimes actually isolating parts of the cutis. The epithelial proliferation, however, extends but little beyond the infiltrated area.

*Wile, U. J.: Further contributions to the experimental aspects of iodid and bromid exanthems. Arch. Dermatol. and Syphilol., 1923, viii, 407-410.

OVOFERRIN OMITTED FROM N. N. R.

Ovoferrin is a solution containing 5 per cent of an artificial protein product in which iron is present in the so-called organic, or masked, form. This product was accepted for New and Non-official Remedies in 1905. From the time of its acceptance, members of the Council have questioned its value, mainly on the ground that it presents no demonstrated superiority to the standard U. S. P. iron preparations. Ovoferrin is a survival of the now obsolete theory that iron in non-ionized form should be more efficient therapeutically than the ordinary iron preparations. The Council on Pharmacy and Chemistry voted to omit Ovoferrin from New and Non-official Remedies because it is an unscientific and superfluous mixture. (Jour. A. M. A., May 4, 1929, p. 1521.)

VIKING PALATABLE COD LIVER OIL OMITTED FROM N. N. R.

Viking Palatable Cod Liver Oil, marketed by the Viking Health Products Co., is cod liver oil containing 0.2 per cent of benzaldehyde. It was accepted for inclusion in New and Non-official Remedies in 1927. In 1928 an advertisement for the product appeared in the Chicago Daily News which was objectionable in that it made unwarranted claims for the product. The rules of the Council on Pharmacy and Chemistry provide that the acceptance of an article that is advertised to the public with unwarranted claims shall be summarily rescinded. The Council voted to omit Viking Palatable Cod Liver Oil from New and Non-official Remedies because it is advertised to the public with claims that are objectionable and unwarranted. (Jour. A. M. A., May 4, 1929, p. 1521.)

CASE OF UNDULANT FEVER IN AN INFANT*

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WITHIN the last few years cases of undulant fever have been recognized with increasing frequency throughout the country. Recently Hardy[3] reported a series of cases in Iowa; a similar series is being compiled at the present time in Minnesota. All authors consider the disease rare in children, particularly in infants. The youngest case in Hardy's[2] series is a child of twenty-two months.

Alice Evans[1] states that the youngest patient among sixty-five diagnosed through serum sent to the Hygienic Laboratory at Washington, was four years of age.

The patient mentioned in the following case, one year of age, is one of the youngest on record.

CASE REPORT

Patient K. M., male, one year old, was referred by Dr. Ehmke of Willow River, Minnesota, on March 18, 1929. The pre-eminent complaints were:

1. Paleness; of one month's duration.
2. Vomiting, occurring about once every two days.
3. Listlessness.
4. Poor appetite.

The child had become sick about a month previously, apparently with a cold. During this interval he had been running fever most of the time. He had coughed some and lost a good deal of weight.

Family History: Essentially negative.

Past History: The child was born March 1, 1918, at full term; birth weight, 8 pounds. Breast fed for two months, he was subsequently fed on a cow's milk formula. Cereal and vegetables were given at the usual time. The milk in the formula was supplied exclusively by two cows, neither of which have been tested for undulant fever agglutination. There were no previous illnesses with the exception of several mild colds.

Physical Examination: The child was extremely pale, weighed 8,720 grams, temperature 102°. The skin was rather dry, the mucous membranes decidedly pale. The throat showed no acute inflammation. His tonsils were moderate sized, the cervical glands just palpable. The ear drums were normal. Lungs were clear to percussion and auscultation. The left heart border was one centimeter outside the nipple line with a systolic murmur heard over the whole heart. The liver was one and one-half fingerbreadths below the costal margin. The spleen was two fingersbreadths below and of moderate firmness. There was some grooving of the chest and some enlargement of the epiphyses.

X-ray of the chest showed a little mottling at the right hilus, somewhat increased over normal, and a slight increase of cardiac shadow.

Hospital Course: He was in the hospital from March 18, 1929, to April 19, 1929.

During the first seven days his temperature was very irregular, ranging from normal to 102-103°. It dropped to normal gradually on the seventh day and remained so during the rest of his hospital stay.

Blood transfusion was performed on March 21, 1929, with no resultant reaction. Two hundred c.c. of blood from the mother were given by the citrate method.

During the febrile period he was extremely fussy, restless, and irritable, and had copious sweats. Shortly after he became afebrile his general condition improved and the sweating ceased. Definite improvement in his behavior became evident by April 2 and continued steadily up to the time of discharge. His weight on discharge was 9,920 grams, a total gain of 1,200 grams in one month. He appeared quite well at this time, his color was good and he was happy. His general physical condition was normal, the heart sounds were normal, the spleen was still one fingerbreadth below the costal margin. He has continued to improve at home up to the preesnt.

As continuous search for a focus of infection had been unavailing, blood was taken for undulant fever agglutination on March 24, 1929, and sent to the State Laboratory. Report was received several days later of the agglutination of bacillus abortus in a titre of 1 to 160. Blood was again taken for agglutination on March 31; agglutination occurred in this specimen in a titre of 1 to 640. A specimen taken at the same time and sent to the Public Health Service. Hygienic Laboratory, Washington, D. C., produced a positive agglutination of the bacillus abortus in a titre of 1 to 1280. Agglutination of the bacillus tularense was not obtained.

LABORATORY DATA

Blood: March 18. The Hb. was 38%; R. B. C. 2,240,000; W. B. C. 14,000. Differential: PMN's 17%, lymphocytes 77%, Eosin, 1%, Mono. 5%.

A blood smear showed hypochromasia, with anisocytosis three plus; poikilocytosis three plus; and some polychromatophilia; the large lymphocytes predominated. Dr. P. F. Eckman, who examined these smears, considered this a toxic secondary anemia because of the evidence of blood regeneration, the short history and the severity of the anemia.

On March 22, the day following transfusion, the Hb. was 50%; R. B. C. 3,750,000. On April 15, the Hb. was 65%; R. B. C. 4,280,000.

The differential remained fairly normal with the exception of shifts in the relation of the lymphocytes

*From the Department of Pediatrics, the Duluth Clinic, Duluth, Minnesota.

and PMN's, the lymphocytes at times being as high as 70%.

Urine: Numerous urine examinations were, on the whole, negative.

Miscellaneous: Von Pirquet and intradermal tuberculin reactions (up to one milligram) were negative. Widal test of March 21 was negative. Blood culture of March 21 negative. Blood Wassermann March 21 negative.

A specimen of the mother's blood produced no agglutination of the bacillus abortus.

COMMENT

A definite instance of undulant fever is presented in a male child, one year of age. The unexplained fever range with the extreme sweating and pallor proved to be significant in the symptom complex. Serum agglutination tests cleared up the diagnosis. The high grade anemia is said not to be a common complication. This boy is now rapidly improving.

BIBLIOGRAPHY

1. Evans, Alice: Some unsolved undulant fever problems. Jour. Am. Pub. Health Assn., Oct. 16, 1928.
2. Hardy, A. V.: Personal communcation.
3. Hardy, A. V.: Undulant fever. Jour. Am. Med. Assn., 92, 853 (March 16), 1929.

THE MARMOLA QUACKERY

Edward D. Hayes has been quacking it for a quarter of a century. Using the trade name "Marmola Company" he exploited a thyroid-containing mixture—Marmola. In 1926 the postal authorities were about to issue a fraud order against the Marmola Company when Hayes submitted an affidavit declaring that he would discontinue the Marmola business. He did so by changing the name of the Marmola Company to the Raladam Company! He continued to sell his nostrum through the drug stores instead of through the mails. Now the Federal Trade Commission has issued an "Order to Cease and Desist," the essential features of which are that the firm cease and desist from representing that Marmola is a scientific and accurate method for treating obesity; representing that the formula from which Marmola is made is a scientific formula; and representing that Marmola can be taken without the advice and direction of a competent medical authority as a safe and harmless remedy in the treatment of obesity. (Jour. A. M. A., May 4, 1929, p. 1541.)

THE RENTAL OF RADIUM

The Council on Physical Therapy publishes a report on the rental of radium which was approved by the Council on Pharmacy and Chemistry. The Council points out that during the last few years some of the firms supplying radium, as well as a few individual radiologists, have undertaken to prepare and to furnish radium to physicians on a rental basis. Rental has not been limited to radiologists, who might be expected to know how to make proper use of the radium, but the intent of this service is to enable any physician to treat his own patients. The Council feels that the rental of radium to physicians cannot be entirely condemned; but, since the physician renting the radium must assume full legal and moral responsibility for the diagnosis and treatment of his patients, the Council does condemn the system of "mail-order" and telephone diagnosis and the type of treatment with which such rental has come to be associated. (Jour. A. M. A., May 18, 1929, p. 1678.)

GALLSTONE ILEUS*

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A RECENT analysis of twenty consecutive cases of acute intestinal obstruction showed a mortality of 65 per cent. The causes of death were chiefly inadequate pre-operative and post-operative care and delayed operation. With proper care and early operation, the mortality should be below 15 per cent.

A study of the mortality statistics in ileus suggests that the less frequent causes give the highest mortality. Ileus due to gallstone is rare. Surgical treatment is often delayed because of the confusing early incomplete obstruction followed by progression of the stone and changing locations of the suspected condition. The mortality from this cause is about 70 per cent.

Gallstone ileus occurs so rarely in the experience of any surgeon that it always arouses interest. Considerable literature on the subject has been contributed and the articles are usually based on one case. Prior to 1910 two hundred and fifty cases had been reported.

Bartholin[2] is reported to have published in 1654 an instance of a gallstone having perforated from the gallbladder into the jejunum.

Courvoisier[4] in 1890 directed attention to the various stages and complications of gallbladder disease and as a result placed this complication and many others on a definite basis.

The frequency of occurrence has been variously stated by several authors. Mayo Robson[7] reports that in 80,000 hospital patients in four large British hospitals the condition occurred four times. Barnard[1] reported eight cases of gallstone ileus among three hundred and sixty cases of intestinal obstruction occurring during an eight year period at the London Hospital. One of the English Royal Infirmaries had one case in 50,000 admissions.

Bloodgood[3] in reporting upon a series of two hundred and eighty cases of intestinal obstruction described one case due to gallstone. Martin,[5] while Professor of Surgery at the University of Maryland, sent a questionnaire to a group of surgeons and received replies from twenty-eight whose experience he estimated at a half million surgical operations. Sixteen cases of gallstone ileus were reported to him.

Courvoisier placed the age limits as between fifty and seventy, and from other reports the average age limit is placed at fifty-five.

The sex incidence is comparable to that of cholelithiasis. Martin placed it in his study as occurring five times more often in females.

The mortality is variously stated and seems to average somewhat higher than in intestinal obstruction in general, and is placed at about 70 per cent.

Gallstones large enough to cause obstruction enter the intestine by three ways:

1. By extension of inflammation they pass directly from the gallbladder to the intestinal tract, usually from the neck of the gallbladder to the duodenum. If they pass into the stomach they may be vomited; if into the colon they are passed in the stool.

2. They may pass from the common duct to the intestine.

3. The progression may be from the cystic duct to the intestine.

In causing obstruction they are usually lodged in the lower ileum near the ileo-cecal valve.

Because of the rarity and unusual character of the occurrence of gallstone ileus, diagnosis must at best be highly speculative. If there is complete interference with the onward movements of the contents of the bowel, well defined and characteristic symptoms of obstruction will develop. The obstruction is seldom complete in the early stages and this accounts for the rather frequent long duration of symptoms. It is natural that incomplete obstruction should fail to produce a real strangulation of the bowel, but would account for a spasm of the muscular fibers of the intestine, and thus less severe symptoms than are characteristic in a complete obstruction. According to Barnard, the characteristic symptoms are the sudden onset, the absence of pain and collapse until late in the attack, the incomplete obstruction and the absence of tenderness and distention in the abdomen. The painful point is occasionally found to be migratory.

*Read before the Minneapolis Surgical Society, Feb. 2, 1928.

Vomiting is a prominent symptom, being severe and continuous.

The clinical history, when one is confronted with a case of intestinal obstruction, may give evidence of previously existing gall-bladder disease. The most frequent mode of entry of the gallstone into the bowel is by a gallbladder-duodenal fistula. It seems probable, therefore, that in a case of previous acute cholecystitis, a fistula is formed between the gallbladder and the duodenum; that this then subsides and at some later date the gallstone is extruded through the fistula and at a time when the symptoms of cholecystitis are not present.

Treves[8] reported a case where the stones were thought to have remained in the bowel ten years and Mayo Robson has cited a fatal case in which the stone weighed only 55 grains.

CASE REPORT

An obese woman of 67 years was first seen on Saturday, December 3, 1927, and recognized as having intestinal obstruction from the fact that she appeared acutely ill, was having repeated attacks of vomiting of a brownish fluid with a fecal odor, and complaining of severe colicky cramps in the left lower quadrant of her abdomen. She had first been seen by a physician on the previous Sunday (six days before). She had had no bowel movements since the previous Tuesday (four days). On the previous Thursday she had vomited fecal material.

Her past history revealed occasional gastric upsets for "many years"; these were characterized by belching of gas, sour taste in her mouth and distaste for food. The attacks seldom lasted longer than two or three days and were usually relieved by milk of magnesia. Occasionally she called in the family doctor. There was no history of pain, jaundice, or clay colored stools.

On physical examination, tympany was elicited over the left upper quadrant of her abdomen; the left lower quadrant was moderately tender but flat, and her attacks of pain were confined to this area. There was some tenderness on the left side to pelvic examination.

The leukocyte count was 16,000, with a slight increase in polymorphonuclears. The temperature was normal. A barium enema showed no abnormal findings.

The operative procedure was as follows. Four inch mid-right rectus incision. The gallbladder was palpated and numerous adhesions were felt in this region. No further procedure in this area seemed warranted. The kidneys were normal to palpation. The pelvis was palpated and the uterus, tubes and ovaries were found normal.

On sweeping the hand up from the pelvis on the left side, a round object about the size of a golf ball (Fig. 1) was encountered which gave the impression of being free in the peritoneal cavity. On bringing the mass into the wound, it was found to resemble a hard ball which was firmly fixed in the lumen of the intestine and could not be moved in either direction. The bowel above the obstruction was moderately distended and below the obstruction it was collapsed. It had a purplish color, indicating a moderate degree of strangulation.

Fig. 1. Gallstone removed from ileum.

The bowel was incised longitudinally over the obstructing stone and the stone pried through an opening which was slightly smaller than the circumference of the stone. The wound in the bowel was immediately aspirated toward the distended site and it was closed by two layers of intestinal catgut after the method of Lembert. The abdomen was then closed in tiers, using four heavy dermal stay sutures and a Penrose drain to the peritoneum. The stomach was washed out at the close of the operation.

Postoperative Course.—A graphic representation of the postoperative course is afforded by examination of the chart (Fig. 2). Summarized, it is as follows:

1. The fluid intake in the first twenty-four hours was a little over five liters, administered by hypodermoclysis, proctoclysis, and limited small amounts of fluid by mouth. Half of this amount was normal saline, which amount seemed adequate to provide enough chloride replenishment. (No determination of the plasma chlorides was made until the fourth day, when it had returned to normal.) Obviously, the fluid intake was the most important contribution in this case aside from relief of the obstruction. Fluids were forced to the limit of her capacity to take them during the succeeding three days.

2. She had several small emeses during the first forty-eight hours; accumulations in the stomach were relieved by gastric lavage.

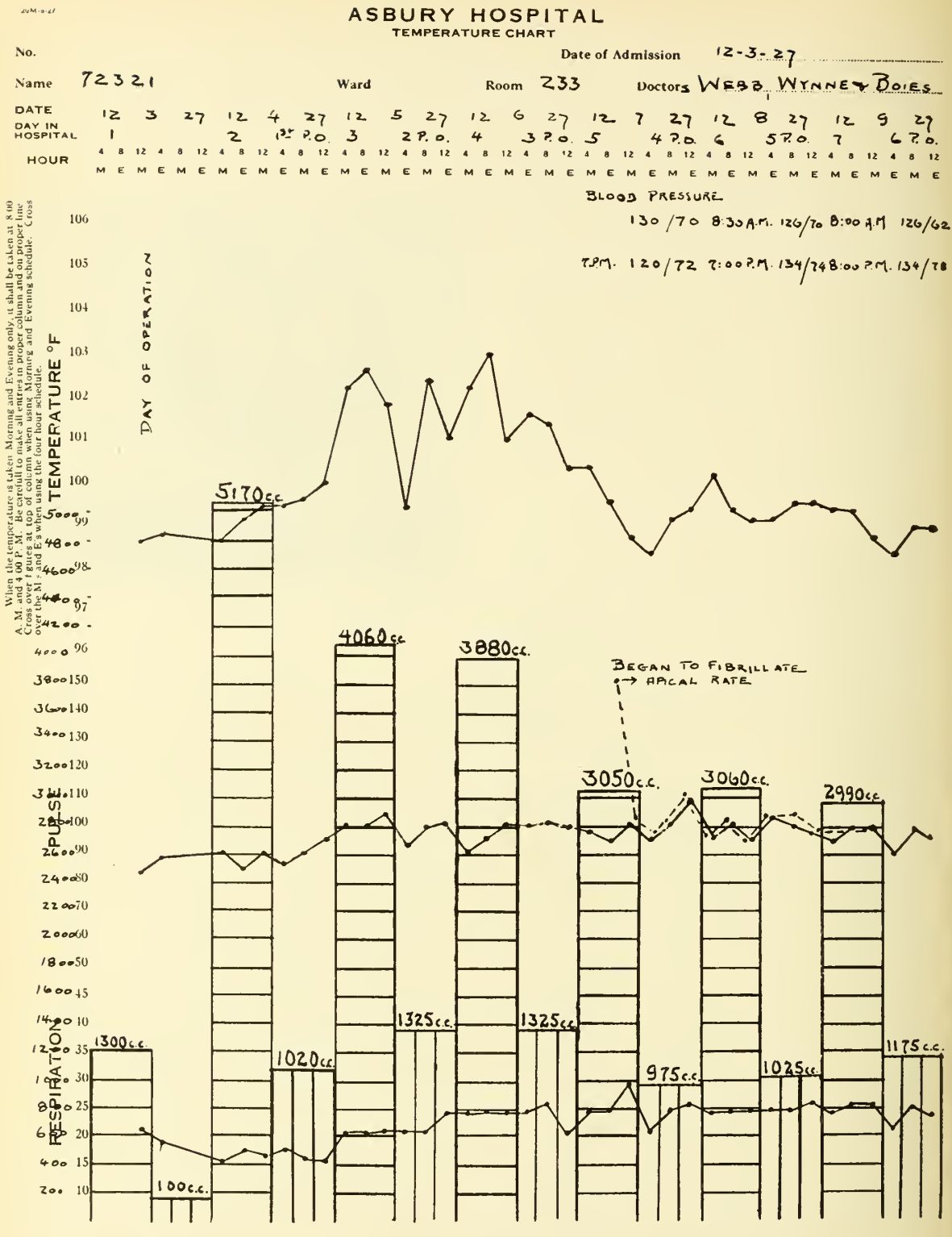
ASBURY HOSPITAL
TEMPERATURE CHART
No.
Date of Admission 12-3-27
Name 72321
Ward
Room 233
Doctors WEBB, WYNNE & BOIES
DATE
DAY IN HOSPITAL
HOUR
BLOOD PRESSURE
130/70 8:30 A.M. 126/70 8:00 A.M. 126/62
P.M. 120/72 7:00 P.M. 134/74 8:00 P.M. 134/78
When the temperature is taken Morning and Evening only, it shall be taken at 8:00 A.M. and 4:00 P.M. Hour circles will alternate according to column in which temperature is taken. Cross over figures at top of column when using Morning and Evening schedule. Cross over the M's and E's when using the four hour schedule.
DAY OF OPERATION
TEMPERATURE °F
PULSE
RESPIRATION
5170 c.c.
4060 c.c.
3880 c.c.
BEGAN TO FIBRILLATE → APICAL RATE
3050 c.c.
3060 c.c.
2990 c.c.
1300 c.c.
100 c.c.
1020 c.c.
1325 c.c.
1325 c.c.
975 c.c.
1025 c.c.
1175 c.c.

Fig. 2

3. On the third day charcoal was administered, which was passed on the fourth day.

4. On the fourth day the patient's heart began to fibrillate but responded to subcutaneous digitalis in forty-eight hours.

5. A wound infection developed which cleared up under Carrel-Dakin treatment.

Her recovery was otherwise uneventful.

COMMENT

The modern treatment of intestinal obstruction

calls for consideration from at least five standpoints:[6]

1. Relief of the obstruction. The matter of early diagnosis being vitally important to the successful outcome, this procedure obviously entails mature surgical judgment and technical skill.

2. The treatment of dehydration begins in the severely toxic patients before operation. Fluids, combined with the one effective agent we now have in combating the toxemia, namely, sodium chloride, should be given in solutions ranging from the isotonic to the five per cent strengths.

3. The toxemia. In recent years (since MacCallum and his associates determined the reduction in blood chlorides in cases of acute intestinal obstruction) the hypochloremia has been recognized as one of the most important lethal factors, and numerous results have been reported on the effectiveness of saline treatment in lowering the mortality. The physiological action of the sodium chloride, however, is not yet wholly understood.

4. Relief of the obstructed intestine, for which the procedures of enterostomy or duodenal drainage have been variously recommended.

5. Relief of the starvation. This is probably the least difficult of the problems to meet and can be accomplished, when indicated, by glucose, which also is of advantage in the control of vomiting.

REFERENCES

1. Barnard: Annals of Surgery, 1892.
2. Bartholin: Obstetrics, 54, 243.
3. Bloodgood: Reported by Martin.
4. Courvoisier: Beitrage zur Pathologie Chirurgie der Geggenwegen. Leipzig, 1890.
5. Martin: Annals of Surgery, 55, 725.
6. Orr, T. G., and Haden, R. L.: Practical points in the treatment of intestinal obstruction. Jour. Kas. Med. Soc., Nov., 1925.
7. Robson, Mayo: Diseases of the gallbladder, 90.
8. Treves: Intestinal obstruction, 1900, 366.

LESIONS OF PERIPHERAL NERVES*

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IT is a just reproach that clinicians are sometimes slow to utilize advances in the fundamental medical sciences yet, if we make a broad survey of modern medicine, we must be struck by the tendency it has displayed from time to time to draw closer to one fundamental science. Thus, John Hunter evolved a new surgery from his researches in comparative anatomy and physiology; with Lister, attention was focussed on bacteriology and the present trend is toward a closer relationship with biochemistry and biophysics. While the surgeon of today knows that treatment, to be rational, must have a physiologic basis, there is much leeway to be made up, and this is well exemplified by the subject under discussion.

Let us consider briefly what happens after complete division of a peripheral nerve. In the course of time, the axis cylinders and their myelin sheaths disappear from the distal segment. The cells of the neurolemma persist, and even increase, in both number and size, occupying the unaffected connective tissue of the segment. These appearances are described in any textbook on surgery. But, when the books tell us that after suture of a divided nerve, axons from the central segment grow down into the old neurolemma sheaths, obligingly waiting to guide them to the periphery, they perpetuate a wrong conception, which, like all such, is hard to dispel. Long ago it was pointed out by Cajal that many of the outgrowing axons tend to pass between the old neurolemma sheaths, and may not enter a sheath at all; it follows that the chance of an axon reaching its original ending is, to say the least of it, remote. Therefore, after even the most favorable case of nerve suture, we must rely for sensation largely, if not entirely, on those fibers the destined habit of which it is to end naked, and for motion, on those motor axons which chance to reach muscle fibers. These anatomic data may seem a frail groundwork for the excellent functional results which follow nerve suture in favorable cases. When we seek for the additional factor which makes such good results possible, we find it to be the amazing capacity for re-education inherent in the human cortex. We can better appreciate how important it is that this knowledge should dominate our treatment if we turn for a little to the technical side of our subject.

INVESTIGATION OF INJURIES TO PERIPHERAL NERVES

Motor palsy.—It is necessary to distinguish between a muscle acting as a prime mover and acting as a fixation muscle, for example, extension of the wrist on making a fist may occur after injuries to the musculospiral nerve, although voluntary extension of the wrist is impossible.

Trick movements.—These may be a pitfall if one is not on the lookout for them. Sometimes they are consciously used by the patient, as when the wrist is flexed by abductor pollicis longus (extensor ossis metacarpi pollicis). Again, when the wrist is extended, there may be sufficient passive shortening of paralyzed flexor tendons to enable the patient to grasp an object. On the other hand, there is a type of trick movement which depends on our position in the animal series. In the course of evolution, the power to start voluntary movements has been gradually displaced from spinal cord to cortex, and with change of site there comes also change of manner of control. When the cord is in control, the lower motor neurons act in terms of muscles only. The cortex acts in terms of movements, with no thought of individual muscles and is likely to force into service any other available muscles if those habitually performing a movement are paralyzed. The resulting movement is rarely pure; thus, after musculospiral and musculocutaneous palsy, the elbow still can be flexed by the pronator-flexor group of forearm muscles but flexion of the elbow is now accompanied by pronation of the forearm. It must also be remembered that a muscle may have two actions; in ulnar palsy, for instance, the extensors, common and special, are able to abduct the fingers.

*From the Section on Neurology, The Mayo Clinic, Rochester, Minn. Submitted for publication May 16, 1929.

As in other trick movements, the result is not pure; with abduction, there is extension.

Electrical reactions.—Experience has shown that too much stress has been laid on polar changes in the response to the galvanic current as a guide to the condition of a muscle. One tests first with the faradic current; if the muscle responds, no further test is necessary. If there is no faradic response, one tests with the galvanic current for the reaction of degeneration. This type of muscular contraction is characterized by its long period; the process of relaxation is much slower than that of a normal muscle. In passing, it is wise to beware of the tibialis anticus; this muscle may respond to the faradic current for some time after division of its nerve.

Sensory functions.—Any one who has mapped out the anesthetic areas which follow lesions of peripheral nerves knows that the field may vary from time to time in any one case. Among the factors which influence such observations, may be mentioned the comfort of the patient, which includes an easy position and a warm condition of the part to be tested. Time spent in explaining to the patient the object and mode of examination is not time lost; to begin an examination without such preliminaries is to puzzle and possibly to antagonize him.

1. The deep pressure sense is important from an orthopedic standpoint, as a check on the integrity of any tendons passing to the part; for usually that sense is preserved if these structures are intact.

2. The area over which painful sensation is lost is, as a rule, ill-defined. For several days after the complete division of a nerve, and later while regeneration is going on, this area is surrounded by a band usually called "hyperesthetic." The term is a bad one, as these areas are really zones of diminished sensibility, in which uncomfortable stimuli give rise to over-reaction.

3. The area of loss of light touch is hardest to map out. This is partly because the sensitiveness of the skin varies with the occupation of the patient, and also because hairy parts feel more acutely than do bare parts. If the whole area is shaved, the outline of lost "light touch" will be found to conform more closely to that of the anatomic distribution of the nerve.

Functions subserved by the sympathetic system.—Signs of paralysis in the sympathetic system are most marked after division of the median, ulnar and sciatic nerves. Interruption of the vasoconstrictor fibers leads to vasodilatation of the anesthetic skin. In the same area, there is loss of sweating, and the superficial layers of the epidermis become so thickened that the skin loses its normal elasticity. The so-called trophic ulcer is usually the result of an injury unnoticed because of the anesthesia. A point which awaits explanation is the readiness with which these ulcers heal after nerve suture, even before conduction has been established in the peripheral segment of the injured nerve.

DIAGNOSIS

Organic lesions of nerves can usually be distinguished from hysterical paralyses by taking advantage of the patient's ignorance of anatomy and physiology. In cases of functional disorder, paralyzed muscle may be found to contract synergically; for example, the extensors of the wrist and fingers may contract while the patient shakes hands. The electrical reactions of such pseudoparalyzed muscles are normal. It must be ruefully admitted that, in spite of the integrity of the nerve trunks, these cases are often harder to treat than those in which a nerve has been divided.

INDICATIONS FOR OPERATION

The following indications for operation were framed as a result of the experience of those British surgeons who dealt with injuries of peripheral nerves in the war.

1. "Total loss of conductivity, sensory and motor, in the territory exclusively supplied by a nerve, persisting after an interval of two months during which proper treatment has been carried out. This interval is an arbitrary one; it allows time for the first appearance of signs of recovery, provided the lesion does not necessitate the lengthy process of regeneration.

2. "Palpable neuromas at the site of injury of a nerve, the function of which is seriously disturbed.

3. "When recovery has begun, but has not progressed according to the usual rate, or has actually ceased; still more when function has relapsed.

4. "Persistent, severe, intractable pain."

In the case of this lesion of peripheral nerves

which come under the care of the neurosurgeon after some operative procedure elsewhere, the intervals allowed for signs of regeneration should be longer, although it must be confessed that the majority of these cases requires reoperation. Perhaps some anatomic error has been committed, such as the uniting of the proximal end of a nerve to the peripheral end of a cut tendon; or the procedure adopted may have been insufficiently radical or physiologically unsound. Operation should not be undertaken if recovery is proceeding with normal rapidity, or when the ultimate outlook is bad even if technical difficulties can be overcome, as, for example, when the great sciatic nerve is injured within the pelvis. If the original wound has been infected, interference must be postponed until about two or three months after it has healed; nothing vitiates an anastomosis so completely as a lighting up of latent sepsis in the operative field.

OPERATIVE TECHNIC

Apart from asepsis and hemostasis, which, as in any operative procedure, must be absolute, the vital step is the free exposure of the nerve both above and below the site of injury before any attempt is made to deal with the lesion. If there is evident loss of continuity, resection and suture is the obvious treatment. Neurolysis is carried out in cases of two types: when a nerve of normal appearance is compressed by scar tissue, and when a nerve trunk is swollen for a considerable length. In the case of a diffusely swollen nerve, the decision to free and not to resect may be reached after the demonstration, by direct faradic stimulation, of some remaining conductivity. If the lesion is circumscribed and is not diffuse, it is best to resect it and resuture the nerve.

Resection of end bulbs must be carried out until individual nerve bundles are visible. This step also tends to equalize the sectional areas of the end to be united, an important factor in ensuring that as many axons as possible find their way into the peripheral segment. The gap between central and peripheral segments which is left after resection of the end bulbs may be greatly reduced by freeing both segments for a considerable distance. The path pursued by the nerve may be shortened by flexing the joints over which it passes. Some nerves, for example the ulnar, may be transplanted to a more direct route. And finally, if all these expedients seem likely to fail, the end bulbs may be tied together, with the limb in such a posture that the course of the nerve is the shortest possible. The limb is then gradually straightened, and in two or three weeks the wound is reopened. It will usually be found that the nerve has been lengthened sufficiently to make suture possible.

With regard to method of suture, there is none of election. Given fine suture material, care in handling the nerve, accurate approximation, and not too tight tying of sutures, it seems to matter very little whether one employs catgut or silk, and whether the stitches are placed in the sheath or through the nerve.

POSTOPERATIVE TREATMENT

Postoperative treatment is directed toward the following points: prevention of overstretching of paralyzed muscles by maintaining the limb in a suitable posture; prevention of adhesions between tendons and their sheaths and adhesions in peri-articular structures, and maintenance of nutrition in paralyzed areas.

A suitable posture is readily attained by the use of splints, but for the prevention of adhesions, it is all-important that certain parts of the limb shall not be continuously immobilized. Large joints are not so likely to become stiff during fixation; but small joints, especially those of the wrist and fingers, must be given freedom of movement, and they require daily active or passive exercising if their suppleness is to be preserved. The best type of splint allows limited movement of certain joints, and even provides for the fixation action of the paralyzed muscles. In adjusting the limb on the splint, constricting bandages are to be avoided, since a tight bandage may so limit the blood supply to paralyzed muscles as to vitiate the result of nerve suture in an otherwise hopeful case.

Nutritional treatment is highly important, although sometimes it is neglected; it is important because when the growing axon finally arrives at its journey's end, it must find an end organ capable of resuming its function in the economy; it is neglected not so much by the surgeon as by the patient, who is often little disposed for the period of persevering after-treatment, without which the end-result will be poor. In heat we have a most

useful aid, easily available as the hot bath; when trophic ulcers are present, radiant heat may be used instead. Massage, which must be regular and methodical, not only improves tone, but also removes from the whole area katabolic products which may accumulate as a result of sluggish blood supply. Electrical stimulation of the paralyzed muscles is useful if it is intelligently applied. It is essential that the parts be well warmed. At first the current employed is the galvanic; each muscle must be stimulated individually and the strength of current used is the weakest which will cause contraction of the muscle stimulated. When faradic excitability returns, the weakest effective faradic current may be substituted for the galvanic, or a sinusoidal current may be used. From the beginning of treatment, the physical therapist must have the confidence and coöperation of the patient. While waiting for the recovery of motor power, the patient must learn the action of each muscle, so that when voluntary power begins to return, he can focus his attention on using it. At first, the muscle may be aided passively by the masseur, and the palsied muscle must never be overtaxed. It is better to do too little than too much.

Of all the stages in the treatment of injuries of peripheral nerves, the postoperative period is by far the most important. From the brief description given, it will be seen that it is directed, from a physiologic point of view, to two purposes: to keep muscles and joints in a state of as great mechanical perfection as is possible, and in due course to put each effector unit to its ordained use, and enable each receptor unit to resume its contact with the external world.

It is manifest that such complete recovery is never possible, if we allow for the way in which the axons of the central portion of a nerve attempt to reëstablish peripheral connections after nerve anastomosis. Now, it is well known that excellent functional results are obtained after nerve anastomosis in suitable cases. To what are we to ascribe these functional recoveries, in the teeth of such unsuitable and even unusable anatomic rearrangements of nerve pathways? The key to success lies in prolonged and painstaking re-education. This is commonly called "muscular re-education," but this is a misnomer. The re-education is, and must be, cortical, and cortical alone. Recovery always will vary directly with the ability of the subject to train his own cortex to interpret correctly data reaching it through pathways which have hitherto subserved other areas, and to set into action his recovering muscle groups by way of unaccustomed upper motor neurons. It is little to be wondered at that the process of recovery is prolonged; as a corollary, if it be found tedious, the final result is likely to fall short of the best which is possible. Anyone who has dealt with these injuries must have noted that, other things being equal, the intelligent and interested subjects will always achieve the best functional results. Further, it is vital for the surgeon who planned and performed the operation to control, and, if possible, personally to supervise, the whole of the after-treatment. He must never relax nor allow himself nor his patient to become discouraged; that way lies the easy path of adoption of trick movements and the possibility of obtaining the best functional result is gone forever.

THE PHYSIQUE OF SMOKERS AS COMPARED TO NON-SMOKERS*

A STUDY OF UNIVERSITY FRESHMEN

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THE effect of tobacco smoking long has been the subject of controversy and speculation. Much positive opinion, for the most part unsupported by scientific evidence, is expressed to the effect that smoking is deleterious to health. Experimental evidence seems to show certain physiological and psychological effects of smoking, but whether these effects are permanent or transitory is not clear. Comparative studies of the physique of smokers as compared to non-smokers have been one approach to the problem of determining the effect of tobacco upon growth and health. It is for the purpose of placing on record some further data of this sort that the present study is presented.

METHOD OF STUDY

At the time of entrance to the University of Minnesota a complete physical examination is performed upon each student and certain data concerning past illnesses, previous health and habits of living are recorded. Included on the examination blank is a question as to whether or not the student smokes. Based upon the replies to this question two groups of students were selected for purposes of comparison. The students in one of these groups stated that they smoked and the ones in the other group that they did not smoke. From the physical examination records of these students certain physical defects and anthropological and physiological measurements were recorded. Tables I and II show tabulations of the data studied.

COMPARISONS OF DATA

The total number of students in the group of smokers studied was 445 and in the group of non-smokers 441. Comparison of the items for the two groups which appear in Table I, such as age, height, weight, etc., has been made by computing the mean and the probable error of the mean for each item, taking smokers and non-smokers separately. The differences between these means, with their probable errors, are shown in columns three and four. Column five gives the possibilities of the chance occurrence of a difference as great as or greater than the difference found. If there is one possibility in five that the observed difference is merely the result of chance, one would feel that the difference probably is not sufficiently great to be significant. On the other hand, if there is only one possibility in a hundred that a difference as great as the one observed could occur from chance alone, one could assume with reasonable certainty that the difference is insignificant.

PHYSICAL AND PHYSIOLOGICAL MEASUREMENTS

Age: The mean age of the students who smoke was almost one-half year greater than the mean age of the non-smokers. Statistically this difference is probably significant. This, of course, indicates nothing except that the smoking habit increases quite rapidly with age among young men. However, this difference in age needs to be considered when comparing items which change markedly with age, such as height, weight, etc.

Height: The Table shows no significant difference between the heights of the two groups. Since the average annual increment of growth at this age is about one inch, to correct for the difference in the age of the two groups mentioned in the preceding paragraph, one would need to subtract one-half inch from the height of the smokers. This would make the difference between the groups .06±1.14 in. Even with this correction, however, the actual difference is less than the probable error of the difference, so the difference is without significance.

Weight: In the findings shown in the Tables the mean weight of the smokers is 0.934±.77 lbs. greater than the mean weight of the non-smokers. To correct for the difference in age one would have to subtract 0.7 lbs. because the average annual increment in weight at this age is 1.4 lbs.,

*From the Students' Health Service and Department of Preventive Medicine and Public Health, University of Minnesota.

Table I

Physical and Physiological Data on Smokers and Non-Smokers

	Mean for Smokers	Mean for Non-Smokers	Difference of Means		Possibilities of a chance difference as great as or greater than the observed difference (approximate)
			Smokers Greater	Non-Smokers Greater	
Age	19.92±.08 yrs.	19.47±.09 yrs.	0.45±0.12 yrs.		1 in 90
Height	68.66±.79 in.	68.67±.82 in.		0.01±1.14 in.	1 in 1.1
Weight	142.46±.54 lbs.	141.53±.56 lbs.	0.93±0.77 lbs.		1 in 2
Ht/wt Percentage	98.11±0.31	97.92±0.32	0.18±0.44		1 in 1.3
Vital Capacity Percentage	104.04±0.36	104.63±0.33		0.59±0.49	1 in 2
Systolic Bl. Pr.	125.06±0.40 mm.	123.99±0.37 mm.	1.07±0.54 mm.		1 in 6
Diastolic Bl. Pr.	73.17±0.39	74.78±0.39 mm.		1.61±0.52 mm.	1 in 27
Pulse Rate	80.17±0.36	79.92±0.40	0.25±0.54		1 in 1.5
Physical Fitness Test Grade	9.75±0.14	11.49±0.16		1.74±0.21	1 in 15,000,000

Table II

Physical Defects, Et Cetera, of Smokers and Non-smokers

Size of Home Community	Percentage Incidence		Difference in Percentage Incidence		Possibilities of a chance difference as great as or greater than the observed difference (approximate)
	Among Smokers	Among Non-Smokers	Smokers Greater	Non-Smokers Greater	
Over 50,000 Population	37.52±1.56%	30.68±1.45%	6.44±2.08%		1 in 27
From 5,000 to 50,000 Population	21.12±1.35%	12.50±1.11%	8.62±1.57%		1 in 10,000
From 1,000 to 5,0000 Population	19.32±1.32%	18.40±1.27%	0.92±1.83%		1 in 1.5
From 50 to 1.000 Population	8.31± .88%	12.50±1.11%		4.19±1.41%	1 in 19.5
Less than 50 Population	8.76± .90%	21.81±1.29%		13.05±1.57%	1 in 15,000
Nasal Spurs Obstruction or Marked Septal Deviation	45.59±1.59%	46.14±1.61%		0.55±2.26%	1 in 1.2
Tonsils, Hypertrophied	10.11± .96%	10.23± .97%		0.12±1.36%	1 in 1.1
Tonsils, Pathological	9.21± .92%	7.95± .86%	1.26±1.25%		1 in 2
Dental Caries	30.51±1.46%	30.00±1.47%	0.51±2.07%		1 in 1.2
Impaired Hearing	3.82± .61%	3.64± .60%	0.18± .85%		1 in 1.1
Albuminuria	7.35± .87%	8.18± .87%	0.83±1.22%		1 in 1.7
Glycosuria	0.44± .21%	0.23± .15%	0.21± .24%		1 in 2
Posture Rating A	15.73±1.60%	10.20±1.26%	5.35±2.03%		1 in 12
Posture Rating B	52.35±1.64%	59.09±1.51%		6.74±2.22%	1 in 23
Posture Rating C	1.12± .48%	5.68± .97%		4.56±1.08%	1 in 175
Posture Rating D	0.20± .21%	0.22± .21%		0.02± .29%	1 in 1.01
Final Physical Rating A	82.81±1.30%	84.54±1.21%		1.73±1.85%	1 in 2
Final Physical Rating B	13.52±1.18%	12.81±1.11%	0.71±1.61%		1 in 1.4
Final Physical Rating C	3.71± .65%	3.73± .54%		.02± .84%	1 in 1.02

making the corrected difference 0.23±0.77 lbs., a finding certainly not significant.

Height-weight percentage: The ratio of each student's weight to the standard weight for a corresponding age and height was calculated and expressed in percentage. The difference between the groups, being less than the probable error of the difference, is without significance.†

Vital Capacity: The vital capacity was expressed as percentage relationship to the standard tables of vital capacity according to weight, prepared by Myers.[1] The average vital capacity of the non-smokers was slightly greater than that of the smokers but the difference is not sufficiently great to be significant.

Blood Pressure: The mean systolic blood pressure of the smokers was higher than that of the non-smokers but their mean diastolic pressure was lower than that of the non-smokers. In neither instances, however, is the difference large enough to be beyond the possibilities of chance. If we combine these two findings we note a rather high pulse pressure for smokers as compared to the non-smokers.

Pulse rate: The difference in the pulse rates of the two groups is not as large as the probable error of the difference, hence, it is certainly without significance.

Physical Fitness Test: The Schneider physical fitness test[2] which was used on aviators during the world war is included as part of the entrance examination. This test, since it is based on the pulse rate and blood pressure reclining, standing and after exercise, is really a measure of the reactivity of the individual's cardio-vascular system. The grades which students make on this test vary from —5 to +18 with the great majority falling between +5 and +15. The average higher grade of 1.74±0.21 made by the non-smokers is significant. The interpretation of this finding is that smokers have less stable cardio-vascular systems than non-smokers. The effect of such a difference upon health or longevity never has been determined.

PHYSICAL DEFECTS AND HOME COMMUNITY

Size of Home Community: The community in which a student had spent most of his life before coming to the University was considered as his home. These home communities were grouped according to size and comparisons made for smokers and non-smokers as shown in Table II. These percentages indicate that the proportion of smokers is greatest among students who come from cities of 5,000 and over and lowest among students from rural communities and villages.

Abnormalities of Nose and Throat: The nasal conditions which were listed as abnormalities were nasal obstruction, large spurs or marked septal deviation. The incidence of these conditions among smokers and non-smokers was practically the same. "Hypertrophied tonsils" and "pathological tonsils" also occurred with approximately equal frequency in the two groups.

Dental Caries: The only condition of the teeth which seemed satisfactory for purposes of comparison was dental caries. This defect occurred with approximately equal frequency in the two groups.

Impaired hearing: Hearing tests on these examinations were made by means of a watch. The incidence of impaired hearing was slightly greater, although not significantly so, among the students who smoked.

Posture: Posture ratings of students were made on the basis of schematograph tracings. The percentages show a higher proportion of A ratings among students who smoke but a higher proportion of B and C ratings among the non-smokers. The D ratings occurred with equal frequency in the two groups. These differences in posture ratings should be discounted somewhat because the posture grade is based primarily upon the subjective judgment of the examiner.

Urinary Findings: The difference between the occurrence of albuminuria and glycosuria in the two groups is not significant.

Physical Rating: Upon the completion of the examination a physician reviews the examination record with each student, explains the significance of the various findings, makes recommendations for the student to follow and writes on the record a "final grade" of A, B, C, or D. This grade is based upon the physician's judgment of the record as a whole and is the basis for assignment of the student to a program of physical activities. The A ratings were slightly more frequent among non-smokers and the B ratings among smokers. The difference, however, is hardly significant. C ratings, which mean for the student only supervised physical

†For this purpose the height-weight tables of the American Life Insurance Companies were used.

education with no drill or athletics, are found with equal frequency in the two groups.

Comment

Results of studies on the effect of tobacco smoking upon health and physique in groups of persons as young as these cannot be considered as final because by persons of 19 years of age the habit has not been practised sufficiently long for degenerative effects, if there are any, to have proceeded very far. On the other hand, by studying this age group we do obtain some information concerning the effect of tobacco upon growth and physiological processes in the period of adolescence.*

Summary

1. Certain data taken from the physical examination records of a group of freshmen University students who smoke is compared with corresponding data from the records of a similar number of freshmen students who do not smoke.

2. Those comparisons show that the students who smoke are slightly older and for the most part come from larger cities than the non-smokers.

3. The mean height, weight, height-weight age percentage, vital capacity, blood pressure and pulse rate show no significant differences between the two groups. However, the mean grade on Schneider's cardiovascular physical fitness test is significantly lower among the smokers than among the non-smokers.

4. The physical defects compared, namely, abnormalities of the nose, hypertrophied and pathological tonsils, dental caries, impaired hearing, posture, albuminuria and glycosuria, did not show any significant differences in incidence among the groups.

5. The final ratings for purposes of classification for physical activities are not significantly different for the groups.

6. A later study will compare the "intelligence test" ratings and the scholastic accomplishment of similar groups of smokers and non-smokers.

*The effect of smoking upon mental processes and scholastic accomplishment will be the subject of a later study upon this same or a similar group of students.

References

1. Myers, I. A. Studies of the respiratory organs in health and disease. Am. Rev. Tuberc. 7:161 (May), 1923.
2. Schneider, E. C.: Cardiovascular rating as a measure of physical fatigue and efficiency. Jour. Am. Med. Assn., 74:1501 (May 29), 1920.

OBSCURE ABDOMINAL SYMPTOMS PRECEDING EPILEPSY IN CHILDHOOD

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THE common conception of epilepsy as a sudden, brief or prolonged loss of consciousness, usually accompanied by a convulsion, overlooks many early manifestations of the disease, which are frequently not suggestive of the epileptic state. In children particularly, where petit mal attacks alone may precede the grand mal stage for months and even years, the symptoms may be of such varied nature, and so unsuggestive of epilepsy, that diagnosis may be very difficult to establish. In the typical case, the convulsion is usually preceded by peculiar and striking subjective symptoms, which comprise the auræ. In the atypical case, particularly in children, the auræ alone may be the sole manifestation of the disorder for lengthy periods, eventually developing the characteristic convulsion. The auræ appear in an immense variety of forms, although in a given individual tend to always repeat themselves in the same manner. These may be motor in type, consisting of a sudden limited muscular contraction, or tremor, or automatic movements of various kinds. Visceral auræ are more difficult to diagnose, and may cause the patient to complain of precordial pain, palpitation, dyspnea, laryngeal spasm, vomiting, colic, and sudden imperative desire to evacuate the bladder or bowels. Sensory auræ, which consist of peculiar sensations commencing in the extremities or abdomen, are commonly observed in these cases. Such seizures, as enuresis during the day-time, complaints of peculiar sensations in the abdomen or head, as well as various momentary mental or psychic lapses from the normal, are, according to Shanahan,[4] frequently overlooked in childhood as precursors of true epilepsy. Attacks of fainting, as well as breath-holding, in early life, not infrequently are the sole forerunners of this disease. Patrick[2] and Levy[1] made careful investigations of many cases of epilepsy, revealing numerous instances wherein peculiar disturbances of various type occurred fairly regularly throughout childhood and adolescence, ultimately developing into the characteristic attacks of grand mal in adult life. These early symptoms included momentary feeling of pressure in the epigastrium with nausea; attacks of gas in the left iliac region, with salivation and belching; nausea beginning in the chest and rising upwards.

Similar observations have been made by Peterman,[3] who states that about half of the cases of epilepsy begin with petit mal attacks. He suggests that the immediate cause of the epileptic convulsion is probably a disorder of the metabolism, and may be the result of a shift of the acid-base equilibrium toward the alkaline side. Disturbances of appetite, constipation, "stomach trouble," "food reactions," etc., which frequently accompany epilepsy, suggest coincident, if not primary, metabolic disorder.

Observation by the writer of a case of epilepsy which manifested obscure abdominal symptoms regularly from the age of three to six, before grand mal occurred, and in which epilepsy had not been suspected previously, prompted the investigation of this subject. Levy and Patrick found that in five hundred cases of essential epilepsy, sixty-four gave a history of recurrent attacks of symptoms which preceded the convulsions for varying periods. Thirteen of these cases presented symptoms which were essentially visceral in origin, including attacks of vomiting or belching, epigastric sensations, "queer" feelings in the abdomen, and sensation of rising gas. The youngest of this group was six years old at the onset of symptoms. Symptoms in some cases recurred for many years preceding the onset of the typical convulsions of epilepsy. These symptoms were generally characterized by regular occurrence, similarity of attacks, suddenness, brevity, and apparent lack of antecedent cause or relationship to the patient's physical condition.

The case about to be described presented regular attacks of abdominal symptoms from the fourth year of life onward. In common with most of these cases, it presented a difficult diagnostic problem, and the diagnosis was not established until the typical convulsion developed.

Case 1.—J. G., male, age six and a half years.

Parents, three brothers and sisters are all well.

There is no history of any nervous, mental, hereditary or degenerative disease in the family.

His past history was entirely negative. His birth was normal.

Since four years old, he has been under observation at irregular intervals for periodic attacks of abdominal pain. These occurred every four to six weeks, for two or three days at a time. During such periods he would complain of apparent pain or discomfort in the abdomen, for a few minutes, accompanied by an imperative desire to defecate, although without success. During these attacks he would become blue, he would also tremble, and have difficulty in speech. The attacks occurred from three to six times a day, having no definite relation to diet or to meals, and occasionally interrupted his sleep. The mother concluded that these attacks all caused pain, although the child did not actually seem to complain of pain.

His appetite had been poor since the onset of the trouble, and he had apparently lost weight. Physical examination revealed a thin, pale boy, weighing twenty-seven pounds, being eight pounds underweight. The tonsils were large, and apparently chronically infected. The lungs were negative. The heart was slightly enlarged, and the first sound was replaced by a loud blowing murmur, heard over the entire heart and in the left axilla. The second pulmonic sound was accentuated. The abdomen was negative, except for a small umbilical hernia, and a slight diastasis recti. Rectal examination was negative. The nervous system was negative. Tuberculin and Wassermann tests were negative.

On the supposition that his trouble might be related to his mitral regurgitation and umbilical hernia, he was put on a regime of restricted activity, a bland milk-low diet, and given digitalis, and mineral oil. Adhesive strapping was applied to the umbilicus. Later calcium bromide was also administered. The attacks continued to recur at the same intervals, and in unchanged manner, although his condition otherwise improved.

Shortly afterward his tonsils were removed by another physician.

He was not seen again until a year later, when he gave the same history of continued attacks of abdominal cramps, every four to six weeks. Between attacks he seemed well. He was sent to a hospital for further study. The heart seemed the same. The urine and stools were normal. The blood pressure was slightly elevated, being systolic 118, and diastolic 75. Roentgen study of the gastro-intestinal tract with barium was entirely normal aside from some redundancy of the sigmoid. Atropine, benzyl benzoate, and an umbilical truss were prescribed.

The boy seemed improved for the next three months, and was not observed again until fifteen months later. At this time he was undergoing a more severe series of attacks, and gave a history of having continued to be subject to them without improvement, since the last examination. On the following morning he suddenly went into a very violent general convulsion continuing for three-quarters of an hour. He was unconscious for four hours afterward, with spasticity of the legs, and trismus coincidentally. Spinal puncture revealed a clear fluid, under slightly increased pressure, but otherwise normal. The leukocyte count after the attack was 28,200. For the next three days he had several attacks of petit mal, during which he would stand in his bed, stare vacantly, gurgle indistinctly, and was unresponsive for a minute or two.

Further questioning of his mother gave a more significant description of his previous attacks, being of a type similar to those observed after the convulsion. Incontinence of the bladder or bowels had not occurred. The boy was observed to become nervous, irritable and excitable for a day or two before the attacks. His mentality was unaffected, and no previous convulsions had occurred.

The subsequent treatment consisted of luminal one-half grain, with calcium lactate fifteen grains, three times daily. After a month this was reduced to twice a day. He has since been entirely free from any trouble, for over five months; this is the longest period he has been without symptoms for three years.

The case is unusual in respect to the atypical symptoms which prevailed for nearly three years, suggesting intra-abdominal disorder, of cardio-vascular origin because of the heart condition. It also suggests the necessity for more acute observation on the part of the attendants, as well as the inadvisability of always accepting a parent's interpretation of symptoms.

Case 2.—G. E., male, age ten years.

This boy has had typical epileptic attacks since seven years old; during the first two years they occurred very frequently, but less often since. The attacks were frequently preceded by nausea and pain in the abdomen. For the past nine months he has had attacks of severe nausea, with pain in the abdomen, and a sensation of something turning over in the abdomen; usually a general convulsion soon follows. On several such occasions the administration of ipecac sufficient to produce emesis produced relief from the symptoms, with out a convulsion developing. Abortive epileptic attacks such as this with symptoms predominantly gastric in type, might easily be wrongly diagnosed as an intra-abdominal condition were the past history not available.

Case 3.—J. V., female, four years of age.

The family history is negative aside from a definite record of allergy, the mother having bronchial asthma, while the patient, her brother and sister have all been subject to eczema.

Her past history includes frequent attacks of asthmatic bronchitis, tonsilitis, and eczema.

Physical examination revealed very large tonsils and adenoids, and chronic papular eczema. Otherwise she was entirely normal.

The history of interest in this connection concerns several periods, each of a few weeks in duration, beginning in her third year. At such times she would at very frequent intervals, cease her play, sit in a crouching position, rub her arms, become suffused, and finally after two or three minutes would expel gas or urinate. Her parents assumed that she was in pain at

such times, although she usually did not cry, but sat in a tense, motionless position, apparently for the moment obvious to her surroundings. The attacks were never observed at night. After two or three weeks of these manifestations, she would become entirely normal, but has had recurrences every three or four months. Her mentality has been unaffected. Masturbation has not been observed. Physical examinations. as well as repeated urinalyses, have been entirely negative. The attacks have been uninfluenced by luminal, bromides, atropine, alkalies, diet, etc.

The absence of visible adequate organic pathology to explain these performances suggests a petit mal, or visceral epilepsy, as the responsible factor. Final diagnosis must be withheld pending future developments.

CONCLUSIONS

1. Epilepsy in childhood may frequently manifest itself for the first few years in atypical disturbances which may not suggest the underlying disease.

2. Visceral attacks of varying nature may be the only symptom, often pointing toward abdominal trouble only, and may be easily misinterpreted.

3. The frequent repetition of a set of obscure correlated symptoms, with lack of organic pathology, should always warrant epilepsy being borne in mind.

4. Of particular importance in obtaining the history of such cases is the ascertaining of fleeting disturbances of consciousness. These may be frequently overlooked by the parent whose mind is fixed on the theory that the child is suffering only from attacks of abdominal pain.

REFERENCES

1. Levy, D., and Patrick, H. T.: Recurrent attacks preceding epilepsy. Arch Neurol. and Psychiat., September, 1928.
2. Patrick, H. T.: Epilepsy in children. Am. Jour. Dis. Child., 35, 653.
3. Peterman, M. G.: Epilepsy in childhood. Jour. Am. Med. Assn., 88, 1869.
4. Shanahan, W. T.: Early convulsions and Epilepsy. New York State Jour. of Med., 27, 903.

ACROMIO-CLAVICULAR DISLOCATIONS

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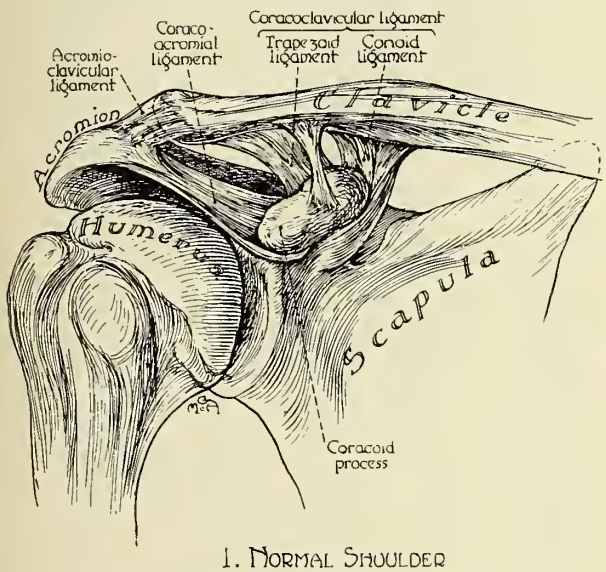
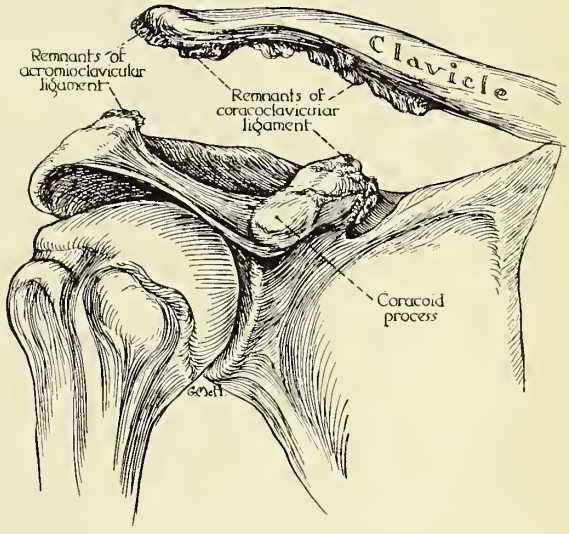
SINCE 1861, when Samuel Cooper performed the first operation for relief of complete dislocation of the acromio-clavicular joint, various operations have been performed to cure this disability. Metallic sutures through the joint, arthrodesis of the joint, excision of the outer end of the clavicle, silk ligaments, and tendon transplants have all been tried. In January, 1924, I performed a ligamentoplasty to relieve this condition. The technic was original at that time, so



1. Normal Shoulder



2. Complete Acromioclavicular Dislocation

far as I know, and the operation has stood the test of time to the complete satisfaction of this patient, and of others since.

Operation is definitely indicated in those cases of acromio-clavicular dislocation in which the coracoid ligaments are torn and have not regained their function after two months or more. The incomplete or partial dislocations of the acromio-clavicular joint are common in young individuals, and frequently occur in football. These cases recover completely with early and adequate treatment. Complete dislocations, however, usually occur in older individuals, and are the result of severe trauma. These cases recover with efficient immobilization, but frequently the injury is considered trivial, either by the patient or the physician, and occasionally it results in marked disability. The arm remains weak, and the patient is unable to do any heavy work.

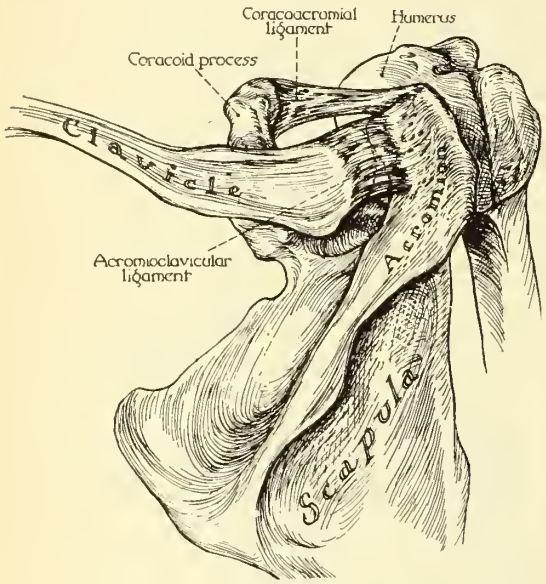
Undoubtedly any operation is better than no operation in these cases, for good results have been reported by all surgeons. The operation of choice, however, is certainly that which most completely restores the normal anatomy. This, I believe, is a ligamentoplasty reconstructing the conoid and trapezoid ligaments with a fascial band. Such fascial bands, when inserted properly into bone, become true ligaments, as Osgood and Bucholtz have shown. Recently we have added a temporary suture of Krupp steel wire around the acromio-clavicular joint.

The conoid and trapezoid ligaments take origin (Fig. 1) from the base and neck of the coracoid process respectively (Fig. 2). The coracoid tuberosity on the clavicle for these coraco-clavicular ligaments is directly superior to this portion of the coracoid (Fig. 3). It will be noted, when viewed from above, that the tip of the coracoid beak projects from one to two centimeters anterior to the clavicle. This operation, if carefully

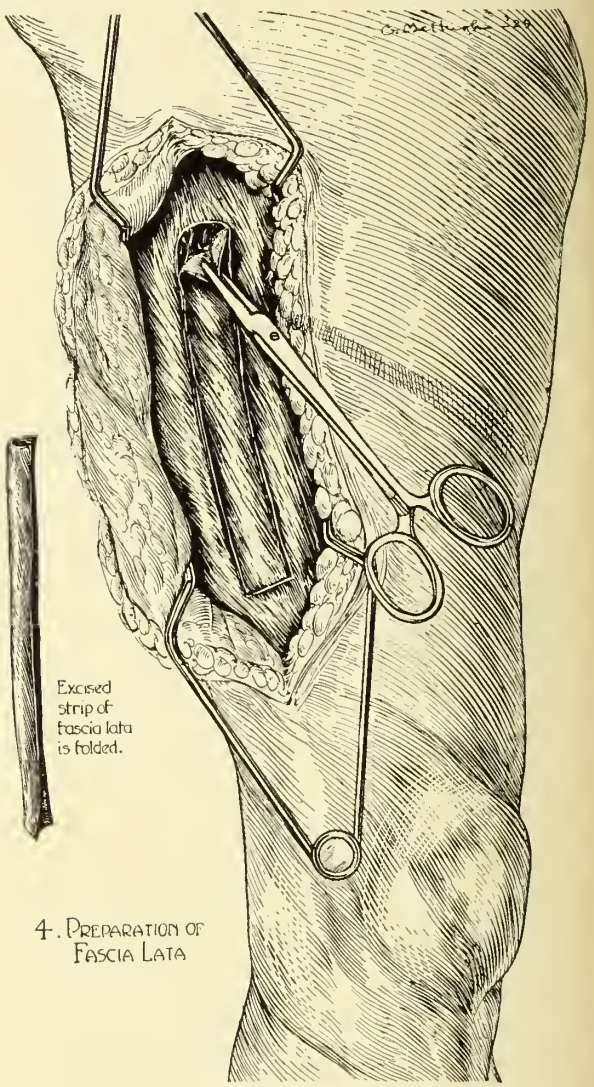
done, reconstructs a ligament from the coracoid tuberosity of the clavicle to the base and neck of the coracoid, which is anatomically sound. A curved incision is made just below the middle of the clavicle sweeping laterally over the acromio-clavicular joint (Fig. 4). The periosteum is carefully raised from the clavicle about the coracoid tuberosity. The base and neck of the coracoid process are exposed, subperiosteally so far as possible, cleaning it of remnants of the ligaments. Next a strip of fascia lata (Fig. 5) two centimeters in width and fourteen centimeters in length, is removed from the thigh. This is folded upon itself lengthwise and passed beneath the base of the coracoid, bringing one end over the clavicle subperiosteally at the site of the coracoid tuberosity (Fig. 6). While an assistant holds the dislocation reduced, the ends of the fascial band are overlapped and held taut until two mattress sutures of heavy silk are inserted through the fascial band.

Recently, since Krupp steel wire has proved completely satisfactory to us, we have passed a temporary suture of Krupp steel wire about the acromio-clavicular joint itself. The articular surfaces of the acromio-clavicular joint are not damaged, and the important gliding motion of this joint is restored after removal of the wire ten weeks later.

The patient is placed in a spica jacket previously prepared, with the arm abducted 90 degrees. These patients are usually able to return to work in ten to twelve weeks. Our first patient returned to college football, and still has perfect function.



3. Superior View of Shoulder Region

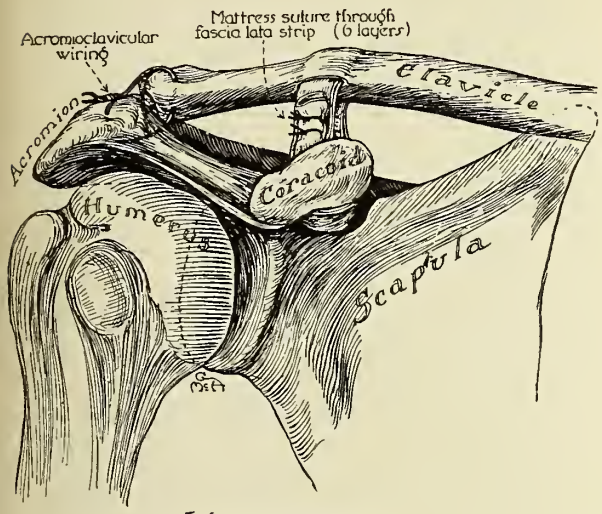


4. Preparation of Fascia Lata

BIBLIOGRAPHY

1. Bunnell, Sterling: Fascial graft for dislocations of acromio-clavicular joint. Surg., Gynec. and Obst., 46:563-564, April, 1928.
2. Cadenat, F. M.: The treatment of dislocations and fractures of the outer end of the clavicle. Internat. Clin., 1:145, March, 1916.
3. Carrell, W. B.: Dislocation at outer end of clavicle. Jour. Bone & Jt. Surg., 10:314-315, April, 1928.
4. Currie, D. I.: Apparatus for dislocations of acro-

mial end of clavicle. Brit. Med. Jour., 1:570, March 29, 1924.
5. Dillehunt, R. B.: Luxation of acromio-clavicular joint. Surg. Clin. North America, 7:1307-1313, Oct., 1927.
6. Dunlop, John: Dislocations of outer end of clavicle. Calif. and West. Med., 26:38-40, Jan., 1927.
7. Fulton, Wm. A.: Treatment for greenstick fractures and for dislocations of clavicle. Journal-Lancet, 43:383-385, Aug., 1923.
8. Gatewood: Dislocation of outer end of clavicle. Surg. Clinics, Chicago, 3:1193 (Oct.), 1919.
9. Lowman, Chas. L. R.: Operative correction of old sterno-clavicular dislocations. Jour. Bone and Jt. Surg., 10:740-741, October, 1928.
10. McNealy, R. W.: Dislocations and fracture-dislocations occurring at acromio-clavicular articulations. Illinois Med. Jour., 41:202-205, March, 1922.
11. Mitchell, A. B.: Dislocation of outer end of clavicle. Brit. Med. Jour., 2:1097, Dec. 11, 1926.
12. Moffat, B. W.: Separation of acromio-clavicular joint. Surg., Gynec. and Obst., 41:73-74, July, 1925.
13. Riddel, J.: Dislocation of acromio-clavicular joint. Brit. Med. Jour., 1:697, April 17, 1926.
14. Watkins, J. T.: Operation for relief of acromio-clavicular luxations. Jour. Bone and Jt. Surg., 7:790-792, Oct., 1925.



5. LIGAMENTO-PLASTY

CASE REPORTS

SIGMOIDAL FISTULA DISCHARGING THROUGH THE RIGHT THIGH*

REPORT OF CASE

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A male, aged 34, presented himself early in July, 1927, with the complaint of a long standing ailment wherein fecal matter was discharged from a fistula in the region of the right trochanter. On my doubting this statement he said he could prove same by taking an enema. I told him I would call at his room at 6 o'clock if he would be prepared for the demonstration and advised him further to have some ordinary "bluing" such as is used in laundries, to use in the enema. The demonstration proved beyond a doubt the correctness of his statement.

The family history of the patient was negative except there was insanity recorded. He had had the usual children's diseases and at the age of fifteen had had typhoid fever, which he claims was the beginning of his present trouble. He states that ankylosis of the right hip, which he also suffers from, ensued during the active typhoid fever, which he claims started in June, 1908, and lasted until January, 1909. He had had influenza nine years before.

The patient's general condition was found to be as follows: Medium build. Temperature, pulse rate and respiration—normal. Weight—136 pounds. Blood pressure—systolic 106, diastolic 60. Heart and lungs normal. Chest expansion—two inches only. No râles. The mental condition of the young man was rather hazy. He appeared to be morose and it was rather difficult to get a full and detailed statement from him. He stated he had seen many physicians and had been diagnosed in various ways, the usual diagnosis being a primary tuberculous hip. Others again held that the typhoid fever had been the cause of the ankylosis and the fistula formation.

There are, as I recall, at least six or seven scars over the right hip, small of the back and outer right thigh region. Two or three of these were open and discharging at the time of his presentation.

The question at once arose as to where the fistula connected with the bowel and as to the method of procedure in order to determine its location.

Fig. 1 shows an ordinary barium enema and the right hip joint ankylosed.

Fig. 2 shows a streak of 15 per cent sodium iodide solution injected into the fistulous opening in the outer thigh, connecting through various ramifications with some portion of the bowel. The picture shows the possibility that the fistula might be in the head of the colon, which would have simplified very materially the procedure.

The next step taken was that of a sigmoidoscopy in combination with injection of water into the sinus in the thigh. A bubbling was discovered 19 cm. in by means of the sigmoidoscope, which established beyond a doubt the connection with the bowel.

Figure 3 shows a rubber tube inserted the distance of 19 cm. Note the constriction of the tube near the anus, obtained by a tightly wound cord at the distance of 19 cm. from the tip of the tube. This gave the location of the fistula high enough to be reached by abdominal approach.

On July 11, 1924, the abdomen was opened under general anesthesia with the rectal tube in situ. A horseshoe loop of the sigmoid bound down by inflammatory tissue was found at the tip of the tube. Extreme difficulty was encountered in trying to free the "loop" and bring it up. During the manipulation my finger was poked into the bowel at this point. Injection of water through the sinus in mid-thigh bubbled into the field of operation. The rectal tube was removed and about 2 inches of the lower sigmoid resected and a Murphy button inserted.

Figure 4. Shows a button *in situ* which did not pass for more than three weeks.

The results were fairly good. There was no discharge of any consequence through the sinus and fistulous openings although the patient felt uncomfortable in the region at times. There was no evidence of tuberculosis in the bowel at the time of abdominal section.

On August 16, a wide incision was made of the major tracts and curettage of same performed.

It appeared as though we had won the victory although no absolute diagnosis had been made as yet. The abdominal wound did not heal properly. A small fistula was discharging, particularly gas, at intervals. There was nothing in the patient's daily routine which would indicate a reason for this. The possibility of a partial non-union in the bowel on account of the poor healing quality of the sigmoid was attributed as a cause.

On November 21, the patient submitted to another abdominal incision in an attempt at a complete closure. The peritoneum at this time was found studded with tubercles which established the diagnosis beyond a doubt. However, the wound healed promptly and when the patient left the city there was only a small discharge present.

The patient was advised to take institutional treatments and from the last communication he was doing fairly well.

*Read before the Minneapolis Surgical Society, Feb. 2, 1928.

Fig. 1

Fig. 2

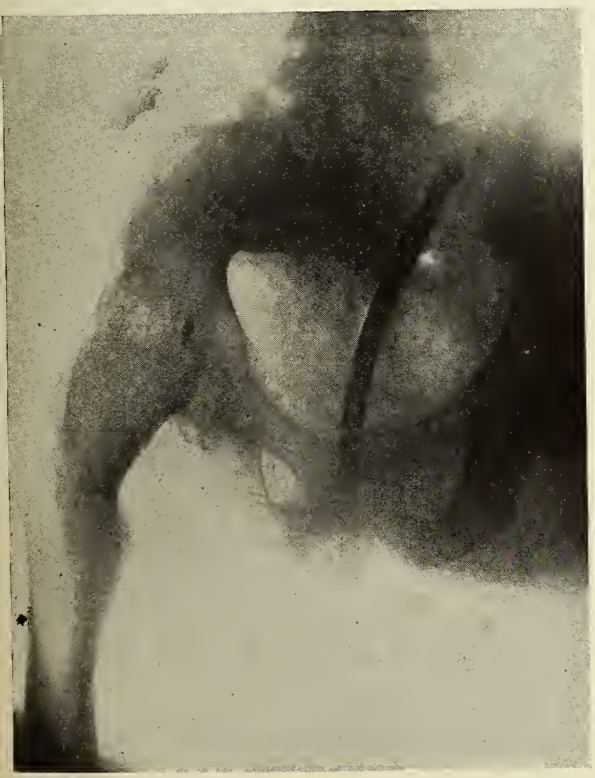


Fig. 3

Fig. 4

RENAL CALCULUS PYELONEPHRITIS*

REPORT OF CASE

LEO MURPHY, M.D.
Minneapolis

The case is of interest because it illustrates the clinical similarity between right kidney pathology and gallbladder disease. Also it shows the very extensive damage to the kidney secondary to the obstructive action of a small cork type of calculus.

The patient was an obese female, aged 53 years. For brevity I shall present only positive points in the history and in the findings. I first saw her in November, 1926, in the hospital with signs and symptoms of chronic multiple arthritis which had been present for about one and one-half years. She remained in the hospital for one month at that time and had some improvement under treatment for arthritis. In stating her history the patient intentionally concealed the information regarding attacks of right upper abdominal colic which dated back about twelve years. She had been examined here and elsewhere for these attacks and had been told that her gallbladder should be removed. Apparently very little attention was attracted to the right kidney at those examinations, although the patient herself felt that her trouble was not in the gallbladder. Her reason for concealing this information relative to her alleged gallbladder was because of fear of operation. During the month in the hospital in 1926 there were no symptoms suggesting pathology in the urinary tract and no investigation was made. Her urine was normal, blood sugar normal, hemoglobin 88, blood pressure—systolic 170, diastolic 110.

In 1927 the patient was at home and felt well except for arthritis and some right sided backache at intervals. I next saw her in October, 1927, in an attack of severe right upper abdominal colic with abdominal distress, fever, chill, nausea and vomiting, increased thirst and tachycardia. There was no urinary frequency or dysuria. The pain was severe and steady and radiated backward and upward rather than down the ureter. There was very definite tenderness over the gallbladder region and no jaundice. On the following morning the patient entered the hospital.

Urinalysis: Albumin was 2 plus; sp. gr. 1,015; pus cells—one plus.

Blood: Urea nitrogen 33.6 milligrams; sugar 0.136; creatinin 1.5; leukocytes 15,000.

Radiogram of the abdomen shows a very large right kidney with a renal calculus in the pelvis.

A cystoscopy was done by Dr. Theodore Sweetser. The bladder was normal except for a mild edema at the right ureteral meatus. Ureteral catheters passed easily but the right catheter did not quite reach the kidney. P. S. P. was normal from the left and no return in three quarters of an hour from the right kidney. The urine from the right contained pus and a pure culture of B. coli; the left, no pus or other abnormality and a negative culture. Sodium iodide injected into the right ureter showed the ureter to be dilated below the renal pelvis. The fluid did not go beyond the stone.

Fig. 1. Roentgenogram showing shadow suggesting urinary calculus.

Fig. 2. Ureterogram showing ureter dilated.

Fig. 3. Kidney removed at operation.

During the following week the patient generally improved. The urine still contained pus and the blood chemistry dropped to urea nitrogen 20.3 milligrams; creatinin 1.72; sugar 0.126; leukocytes 10,000. Another cystoscopy was done to determine the condition of the left kidney. This was found to be normal and a pyelogram of the left kidney revealed a slightly dilated pelvis with calices broader than normal. On the right side it was impossible to pass a number 9 silk catheter past the stone. Indigo carmine appeared normally on the left side and only a faint trace in twenty-five minutes on the right.

Diagnosis: Right renal calculus with marked pyelonephritis.

Exploration of the right kidney was advised. This was done through a Mayo lumbar incision and the right kidney was found to be studded with tiny ab-

*Read before the Minneapolis Surgical Society, Feb. 2, 1928.

scesses. The small stone could be felt at the ureteropelvic junction. Nephrectomy was done with the removal of the upper part of the ureter. On examination of the kidney after removal it was found that the stone was missing. Therefore a catheter was passed down the distal ureter and the stone was encountered in a lower part of the ureter. The stone was then milked upward and delivered.

The convalescence was uneventful and the patient has already shown a marked improvement in her arthritis.

ERGOTOLE, EXTRACT OF ERGOT PURIFIED, ERGOTIN-MERCK, LIQUOR ERGOT-MULFORD, AND SECACORNIN OMITTED FROM N. N. R.

All of the ergot preparations included in New and Non-official Remedies, 1928, are watery extracts and as such, according to the current view, cannot contain much of the active alkaloids which are the important constituents of ergot when viewed from a clinical standpoint. With one exception, none is assayed by the U. S. P. method or any other method that will show the content of active alkaloids. The methods by which they are assayed show only, or mainly, the content of putrefactive amines, which have not proved desirable in obstetric work. The referee of the Council on Pharmacy and Chemistry for ergot preparations reported assays of the accepted brands not claiming assay by the official method (except Liquor Ergot-Mulford) which showed the preparations to contain less than 10 per cent of their claimed strength. In other words, they were found practically devoid of specific alkaloids. The Council voted to omit Ergotole, Extract of Ergot Purified, Ergotin-Merck, Liquor Ergot-Mulford, and Secacornin from New and Non-official Remedies. (Jour. A. M. A., May 4, 1929, p. 1521.)

EFFECTS OF CONTINUOUS USE OF ALLONAL AND AMYTAL

"Allonal," according to a report of the Council on Pharmacy and Chemistry (Jour. A. M. A., June 12, 1926, p. 1853), is a preparation containing a combination of allylisopropylbarbituric acid and amidopyrine mixed with free allisopropylbarbituric acid and an excess of amidopyrine. "Amytal" is stated to be isoamyl-ethyl barbituric acid. The effects from the continuous use of either of these drugs in doses of two tablets daily cannot be stated accurately in a few words because the barbituric acid derivatives give rise to an extraordinary variety of symptoms under different conditions. It is possible that no ill effects would follow from such daily doses in a healthy adult in whom sleeplessness resulted solely from unusual cerebral activity, if the use were not too prolonged. At the other extreme, such doses taken continuously over a long period by an invalid suffering from a serious condition in which various other drugs were taken might lead eventually to the typical symptoms of barbital poisoning, with pneumonia and death. Neither Allonal nor Amytal stands accepted by the Council on Pharmacy and Chemistry. (Jour. A. M. A., May 25, 1929, p. 1783.)

President's Letter

THE salutary effect of the Basic Science Law and the repeal of the Massage Act by the last session of the Legislature is evidently to bring about unlooked for results. The new educational and training requirements for the auxiliary remedial branches are to be met by appropriately specialized educational facilities.

In Europe, particularly in the Scandinavian countries, the systematic and scientific teaching of massage has reached a high stage of development. Careful investigation, however, has revealed the fact that in the United States there is no school in which massage and mechanotherapy are systematically taught under medical supervision. Short courses are, nevertheless, given in some institutions, but no well defined, coördinated and unified curriculum, of adequate scope, is in force in any institution in this country.

It is gratifying to learn that a movement has been inaugurated to establish a school of massage, mechanotherapy and physicotherapy in the Twin Cities. Dr. Arvid Reuterdahl, the eminent scientist, has associated with him Mr. T. M. Larson, a graduate masseur. Dr. Simon and Dr. Harrington, Health Commissioners of St. Paul and Minneapolis, respectively, are also interested. There is to be selected an Advisory Board of medical men to have general supervision of the conduct of the school. Doubtless Our Association and the medical profession in general will welcome the advent of such a school. It is intended that the institution shall be a model and set the standard for all future schools of this type in the United States. Carefully balanced curricula have been prepared for the new school, which will be known as the "Basic Science Institute and Sanatorium."

Entrance requirements include graduation from an accredited high school, certification of good character and personality, and possession on the part of the applicant of a vigorous and healthy body. Among the enumerated purposes of the courses are:

1. To provide sufficient cultural background to instill respect for knowledge and its adequate safeguarding.
2. To inculcate disapproval and disrespect for fraud and charlatanism.
3. To foster the spirit of service to mankind.
4. To train the student in courteous and ethical behavior.

Each course involves a period of two years. One school year consists of three quarters. A school week is composed of thirty hours of coördinated theory and practice. Thus a complete course consists of 2,160 hours.

That thorough training is an ideal of the new institution is evident from the following synopsis of its curricula:

Course in Massage and Mechanotherapy

First Year

1st quarter: Outline of science, fallacies and frauds, anatomy, physiology, physiology of massage, kinesiology, dermatology, first aid.

2nd quarter: Outline of science, anatomy, physiology, dermatology, orthopedics, histology, massage technic, corrective exercises.

3rd quarter: Same as second quarter.

Second year

1st quarter: Psychology, medical ethics, pathology, massage technic, mechanotherapy, corrective exercises, dietetics.

2nd quarter: Phychology, pathology, massage technic, mechanotherapy, corrective exercises.

3rd quarter: Pathology, massage technic, mechanotherapy, hydrotherapy, thermotherapy.

Course in Physiotherapy

First Year

Same as first year in massage and mechanotherapy.

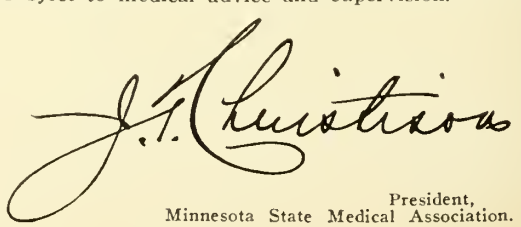
Second Year

1st quarter: Psychology, medical ethics, pathology, corrective exercises, dietetics, principles of apparatus, physics, chemistry, elements of electricity.

2nd quarter: Psychology, pathology, mechanotherapy, radiology, actinotherapy, electrotherapy, hydrotherapy.

3rd quarter: Pathology, surgical observation, mechanotherapy, radiology, actinotherapy, electrotherapy, hydrotherapy, thermotherapy.

All medical subjects will be taught by duly qualified members of the medical profession. The work will be under the supervision of the State Board of Medical Examiners, and treatments at the Sanatorium will be subject to medical advice and supervision.



President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

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Vol. XII July, 1929 No. 7

PRE-SCHOOL EXAMINATION

Three years ago certain physicians in Saint Paul, numbering for the most part the pediatricians of the city, were prevailed upon to examine children of pre-school age at the special spring and fall clinics conducted at the various city schools. They have continued to conduct the examinations free of charge until this spring.

There has been a growing feeling among physicians in general that they are called upon to furnish free services for a variety of causes, which, although very worthy, should not be classed as charity. There has been an increased realization of the importance of periodic health examinations and the child of pre-school age doubtless should have a periodic examination as well as the infant or child of school age. It was doubtless to further the idea in the lay mind that these examinations were conducted gratis.

A committee of the local medical society recently investigated the matter and recommended that pre-school examinations in the future in Saint Paul be conducted by private physicians except in such instances where parents are not able to afford such services, in which case the children should be taken to the free dispensaries or Baby Welfare Clinic.

Such action we believe to be fully justified. In the first place examinations of children in large groups at school buildings are likely to be less satisfactory to physician and parent alike as compared with those conducted in the office or dispensary. Secondly, there is no good reason why a physician should donate his services to individuals who can afford to pay a fee for such an examination.

HEALTH MEETINGS COMING TO MINNEAPOLIS

The week of September 30 to October 5 will be a notable one when ten public health organizations meet in Minneapolis. The occasion of the meeting of several national health associations is to be utilized for the simultaneous assembly of a number of state organizations devoted to public health activities.

The Minneapolis Civic and Commerce Association has made it possible for all ten associations to meet in the Minneapolis Auditorium. The meetings are being backed by state, county and municipal agencies devoted to the various phases of public health. Education in health matters is the keynote of the conference in which the laity as well as physicians, dentists, public health officers, and nurses will all take part.

An executive committee and the various subcommittees have been appointed with Dr. Richard Olding Beard as executive secretary. Committee members consist of individuals interested in some phase of public health activities both local and statewide.

The associations which will meet at this time are:

The American Public Health Association, The American Child Health Association, The International Society of Medical Health Officers, The American Association of School Physicians, The American Social Hygiene Association, The Conference of State Sanitary Engineers, The State Sanitary Conference, The Minnesota State Public Health Association, The Minnesota State Organization for Public Health Nursing, The Northwest Conference for Child Health and Parent Education, with an Educational Public Health Exhibit for the benefit of the people at large.

"TOMMY" LEE

In commemoration of the completion of thirty-seven years on the medical faculty of the University of Minnesota a dinner was given May 18 at the Minneapolis club by a number of medical friends of Dr. Thomas G. Lee.

Dr. Lee is the last member of the original medical faculty to retire from active teaching and his retirement constitutes in a way a milestone in the history of medical education in the state. In 1892 the Medical School of the University of Minnesota was organized. The two existing medical schools in the state, one in Saint Paul, known as the Saint Paul Medical College, and the other carrying on its activities at St. Barnabas Hospital in Minneapolis, surrendered their charters at that time in favor of the newly instituted school at the University.

When Dr. Lee came to Minneapolis from the University of Pennsylvania in 1892 the present pharmacy building was under construction to house the medical, pharmacy and dental schools. The medical course at that time was a two year course. From time to time the course was lengthened until the present seven year course was adopted.

As many of our readers know, Dr. Lee's special interest was embryology. It was he who was instrumental in gathering a large portion of the specimens for the present embryological museum at the medical school. Thousands of physicians practising today took his course and will regret to hear of his retirement. The doctor will move to his home at Babson Park, Florida.

OBITUARY

J. E. Le Clerc

1868-1929

Dr. J. E. Le Clerc of Le Sueur, Minnesota, was born in Quebec, Canada, March 21, 1868. He graduated from Laval University, Quebec, in 1893, and first located in Duluth. In 1894 Dr. Le Clerc married Adele Fortier of Quebec and in 1896 they moved to Le Sueur. For twenty-five years Dr. Le Clerc was secretary of the Nicollet-LeSueur County Medical Society. His death occurred May 6, 1929, from pneumonia.

Dr. Le Clerc had the distinction of being the first to volunteer his services from Le Sueur at the beginning of our participation in the World War. While in service he was promoted to the rank of Captain and later received the commission of Major.

After the war Dr. Le Clerc became much interested in the American Legion and was known as the father of the Legion in Le Sueur. At the services held in honor of their much beloved former commander Legion members from neighboring posts took part in the ceremonies and shared in the expression of esteem in which the doctor was held by all who knew him. Besides being an active physician Dr. Le Clerc took a great interest in medical society affairs and local civic activities. He is survived by his wife, his aged father in Montreal, two sister and two brothers.

George O. Welch

1860-1929

State of Minnesota Department of Public Institutions
St. Paul, June 5, 1929.

In the death of Dr. G. O. Welch, for more than 35 years superintendent of the State Hospital at Fergus Falls, Minnesota, the entire community has suffered an irreparable personal loss, and the State Board of Control and superintendents of state institutions have been deprived of one of their most genial, sympathetic and devoted friends and former associates.

Dr. Welch held first rank in his chosen profession. As a citizen he was patriotic and progressive and as superintendent of the Fergus Falls State Hospital he made an enviable record by his fairness, and his marked devotion to the needs of the patients. He was a valued citizen and friend. He gave unstintingly of his time and his talents to the professional side of his work, while he gave his whole heart and soul to the many and diverse personal phases of his contact with the patients under his care.

The State Board of Control wishes to record its heartfelt appreciation of the personal character, the fine qualities of mind and the loyal devotion to duty that marked Dr. Welch's entire carcer, and hereby gives official expression to such appreciation to be made a part of the Board's record and copies of the same to be sent to the family of the late superintendent.

Dated at St. Paul, Minnesota, this 5th day of June. 1929.

State Board of Control,
Blanche L. LaDu, Chairman,
John Coleman
C. J. Swendsen

CONSULTATION BUREAU

Wm. A. O'Brien, M.D., *Director*
Minnesota State Medical Association
11 West Summit Avenue
Saint Paul, Minnesota

1. *Question.*—What is the classification of diseases of the heart, which is taught by the Department of Pathology at the University of Minnesota?

Answer.—Outline of Diseases of the Heart by E. T. Bell, M.D.:

I. Endocarditis
  A. Rheumatic
    1. Acute
    2. Recurrent
    3. Old valve defect
  B. Bacterial
    1. Acute
      a. Primary
      b. Secondary
    2. Subacute
      a. On previously normal leaflet
      b. On old rheumatic leaflets
  C. Syphilitic
  D. Senile or arteriosclerotic

II. Diseases of the Myocardium
  A. Acute Exudative Myocarditis
    1. Abscesses
    2. Infected mural thrombi
    3. Extension from pericarditis
  B. The Toxic Myocardium
    1. Mild—mild infectious processes
    2. Severe—severe infectious processes (diphtheria)
  C. The Hypertension Heart
  D. Coronary Sclerosis
    1. With hypertrophy
      a. Without congestive failure
      b. With congestive failure
    2. Without hypertrophy
      a. Without congestive failure
  E. Right Heart Failure
  F. Thyroid Heart
    1. Hyperthyroid
    2. Hypothyroid

III. Diseases of the Pericardium
  A. Acute
    1. Fibrinous
    2. Serous
    3. Purulent
  B. Chronic Adhesive

IV. Congenital Heart

Common Clinical Diagnoses	*Pathological Findings*
I. Chronic Myocarditis	Hypertension Heart Coronary Sclerosis Old Valve Defect Adherent Pericardium
II. Mitral Regurgitation	No Disease—Accidental Systolic murmur Hypertension Heart Bacterial Endocarditis Old Valve Defect Adherent Pericardium Coronary Sclerosis—congestive type
III. Aortic Regurgitation	Bacterial Endocarditis Old Valve Defect Luetic Aortitis Hypertension
IV. Chronic Interstitial Nephritis	Hypertension heart with congestive failure, edema and albuminuria

Comment: You will note that syphilis is included under endocarditis and not under myocarditis, because of the infrequent findings of spirochetes or syphilitic lesions in the muscle. Gumma may occur, but it is very uncommon. Right heart failure may be due to chronic lung disease; e.g., bronchial asthma, bronchiectasis, pulmonary fibrosis, and disease of the pulmonary arteries (Ayerza's disease). Hypothyroidism may produce a diffusely dilated heart (myxedema heart). Hyperthyroidism may cause cardiac changes, but no examples of uncomplicated deaths from cardiac failure have been found. The cardiac arhythmias belong in clinical classifications. The classification of the American Heart Association was published by F. A. Willius, M.D., in Minnesota Medicine, June, 1929, pages 356 and 357.

2. *Question.*—Are there reliable firms which furnish radium emanation?

Answer.—The American Medical Association has a list of firms whose products are accepted by the Council. Radium emanation (radon) is supplied in a variety of containers for definite types of radiation (Beta, Gamma, or both). Radon may be ordered in glass, gold, or platinum seeds, now called implants, which may be buried in the tissues and allowed to remain. Both types of radiation are given in this way. Bare tubes in a capsule of heavy metals, brass, gold, silver, etc., supply Gamma radiation. They are sometimes buried in the tissues and removed at a later date. Glass bulbs or bombs with a thin screen are used for surface applications and supply both types of radiation. In ordering radon, it must be remembered that approximately four days after the gas has been measured, half the strength has disappeared. The material is inert at the end of one month. There may be leakage from rough handling, and all of these factors must be considered in estimating the dosage.

3. *Question.*—I have a patient, a fourteen year old girl, who has had a moderate elevation of temperature for the past three months. I have not been able to find any cause for the fever. Have you any suggestions?

Answer.—The diagnostic possibilities are as follows: Tularemia, undulant fever (Malta fever), localized purulent collections (pelvis, sinus, thorax, subdiaphragmatic, perinephritic, actinomycosis), suppurative pyelonephritis, endocarditis, osteomyelitis, septicemia, pyemia, tuberculosis, Hodgkin's disease, leukemia, malaria, and malingering. Go over the history again from an epidemiological viewpoint. Re-examine the patient very carefully with the idea of localizing a purulent collection. Most of the perinephritic abscesses are found by men who are constantly on the lookout for them. Send blood to the State Board of Health for test for tularemia and undulant fever. Examine the blood and urine at frequent intervals. If there are any palpable lymph nodes or tumor masses, excise for biopsy. A positive blood culture would be very helpful in making a diagnosis of septicemia or endocarditis. Radiographs of the sinuses, chest, and bones would also be helpful. If all of the examinations are negative, malingering should be considered, and a little detective work done.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Medical Standards Maintenance Urged

The following clipping from the St. Paul Pioneer Press will be of interest to physicians:

"Chicago, May 7.—While sympathizing with the movement toward reduced medical costs, Rev. A. M. Schwitalla, M.D., president of the Catholic Hospital Association, addressing the organization's annual convention here Monday, warned against any radical action which might result in lowering medical standards.

" 'The cry has gone abroad that sickness should be made much cheaper,' he stated. 'It is urged that the monetary value of the services of physicians must be standardized and if possible reduced. I am sympathetic with this movement. It contains elements of unquestioned good, but is it not possible to have the sick human being obscured by the dollar sign? Our chief concern should rather be to render increasing service, more scientific, more spiritual service, than to reduce the cost of treatment.

" 'In the midst of the discussion let us not lose sight of the fact that if hospital costs are diminished at the cost of hospital standards we are retrogressing instead of progressing and we are allowing purely secondary considerations to actuate us in the tremendously important work that is ours.'

"The president said he approved a thorough study of financial problems of the hospital but asserted that the criterion of a good hospital must remain the professional, medical and nursing care given to sufferers.

"The laymen are assuming increased responsibilities for public and private health. Some of our public health workers are not physicians. The social worker, moreover, has brought a viewpoint into the hospitals which unquestionably is true, correct and fundamental.

"But in the midst of all this the function of the physician may readily be overshadowed and we may be taking out of the hands of a competent authority responsibilities which we are injudiciously placing in the hands of those who have not been adequately trained for the medical solution of the patient's problem. The physician's responsibility cannot be waived in view of the hospital's responsibility for the patient.

"Dr. Schwitalla asserted there is danger in fostering a non-medical attitude toward the sick. The physician's interest, he added, will tend to lag if he is in any way relieved of responsibility."

MISCELLANEOUS

THE STATE AUXILIARY*

Mrs. Ben F. Davis
Duluth, Minnesota

Mr. Toastmaster, Ladies and Gentlemen:

Before I tell you about the Auxiliary, I feel I must express the gratitude of the Auxiliary to the Minnesota State Medical Association as a whole and especially to the executive officers of the Association for their untiring kindness and helpfulness. We are deeply grateful and I would be remiss in my duty to the Auxiliary if I did not at this time thank you most heartily for all that you have done for us.

There are many reasons for a Women's Auxiliary to the Medical Profession. The social side is a very pleasant consideration for through the activities of the Auxiliary there will be established a closer relationship and better understanding among the physicians' families. Though I do believe that the most important reason is the service which we can give to the public, as well as to the Profession, through learning something about the economic side of medicine.

It is a well-known fact that quacks and faddists are constantly seeking an opportunity to address Women's Clubs for the purpose of spreading their propaganda. There is hardly a Women's Club of any type in the Country which does not number in its membership a physician's wife. These members could offset the effects of such propaganda if they would exert themselves a little to learn the professional viewpoint. We urge our physicians' wives to accept places on the Health Committees of their various club affiliations and see to it that the right kind of Health Programs are in their Year Books. By these club contacts much good can be accomplished.

The function of the Women's Auxiliary is to cooperate with and support in every way the State Medical Association. Its aims are our aims and anything that we can do to enhance its interests will redound to our credit. In order to be most efficient we must increase and perfect our organization. The total membership in Minnesota is 766. We are proud to say that 239 new members have joined since last June. There are thirteen counties organized and others in process of organization, leaving twenty-five counties which remain to be organized. It is hoped that with your coöperation these counties may be brought into the Association this coming year.

Those of you who have Auxiliaries in your town must admit that you know more doctors and their wives as a result and that you know them better.

What good is there to all this? Much.

To prove this point I shall tell you a few things that doctors' wives organized into Auxiliaries in Minnesota have accomplished.

They are given the credit for a jump in attendance at the State and County meetings.

They helped materially in the passage of the Medical Practice Acts. This does not mean that they interfere in politics. It means that they are intelligently informed and can inform others.

They solicited Hygeia subscriptions for schools and libraries.

They sponsored a fourteen day Health Trail in Duluth during which sixty-one public meetings were addressed by physicians, health talks were given over the radio and interest in the matter of health was further aroused by means of an Essay Contest, a Poster Contest and a Health Personality Contset.

They coöperated with the Public Health Committee of the State Medical Association in its campaign of Education.

They donated to the Community Fund.

They also donated to the Michael Dowling School.

Loans have been made to the families of needy physicians.

The local auxiliary made gowns and bed-jackets for tuberculosis hospitals; made surgical dressings and aprons for hospitals; coöperated with the county nurses; provided books and toys for children's wards and furnished rooms and wards in the hospitals. They also made layettes for needy mothers.

They established and operated a nurses' loan fund scholarship and scholarships for medical students.

They have collected historical data for the State Society.

The Auxiliary sponsored a tea shop at the meeting of the American Medical Association for the convenience of those attending the convention.

The Auxiliary has, in my mind, proved its worth. It is here! Let us take advantage of it and, in helping it, help ourselves.

*Address at the Annual Banquet of the Minnesota State Medical Association, St. Paul, May 14, 1929.

THE NEW HEALTH OPPORTUNITY

The people of Minnesota, whether of professional or of lay following, have never had such a baptism of public health as they will receive in the week beginning September 30, 1929. And it is fair to believe that they are ready for its coming. It is not a matter of revival. It is a new awakening into a consciousness of the value of human health. We believe the public mind is ready for the gospel it will have a chance to hear. The soil has been well prepared of late for the sowing. Medical and public health agencies have been coöperating with each other, in the recent past, in a new willingness—one might well say a new enthusiasm—to carry health information directly to the people.

It is thirty years since the American Public Health Association held its annual meeting in this State. In that day it was the only notable organization of its type. Since then the whole significance and appreciation of health work has been changed. Public health agencies and institutions have multiplied. Research work has developed in the public health field. The recognition of the specific causes of disease has wonderfully advanced. Prevention has become possible, and what is of equal moment is that its possibilities have won appreciation in the intelligence of the people. They are demanding, not merely to be saved from the

consequences of disease, to be cured of their inherited and acquired ills—but in a word, *to be well.* The conception of positive health is of recent birth, but of rapid development.

The coming Health Meetings should do much for the Twin Cities, for Minnesota and the entire Northwest. The message to the new health Garcia needs but to be started on its way. It travels fast in these days. The mechanism of publicity requires but to be put in motion.

Richard Olding Beard, M.D.
Executive Secretary of the Local Committee.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

SYMPOSIUM ON PHYSIOLOGY AND BIOCHEMISTRY

The University of Minnesota, through its Medical School and the Mayo Foundation, will conduct a program of Physiology and Biochemistry between *July 15 and August 15, 1929.*

The following foreign scholars will be present:

Prof. M. von Frey, Professor of Physiology and Director of the Physiological Institute, Wurzburg, Germany. His work on the physiology of the special senses is internationally recognized.

Prof. Otto Meyerhof, of the Kaiser-Wilhelm Institute for Biology, Berlin, Germany. Dr. Meyerhof is noted in the field of General Physiology and received (in company with Hill of London) the Nobel Prize for his work on muscle.

Prof. T. Thunberg of the University of Lund, Sweden, investigator of vital oxidation phenomena, artificial respiration and metabolism. He will lecture on the mechanism of biological oxidation.

Prof. G. Anrep, Lecturer in Physiology, Cambridge, England. Dr. Anrep was associated with Prof. Pavlov in Petrograd for several years and will lecture on Conditioned Reflexes.

Prof. E. Laquer, Director of the Pharmaco-therapeutic Laboratory, University of Amsterdam, Holland. His researches have been on Sex Hormones and related problems.

Prof. Waldschmidt-Leitz, German Technical High School, Prague, Czecho-Slovakia. Until recently he was an associate of Prof. Willstëtter in Munich and his field in Enzyme Chemistry.

Each guest scientist will deliver several lectures in English on subjects of his choice and in the field of his special research. Part of the lectures will be held in Rochester, Minn. Each lecturer will conduct one or more weekly seminars and have an office where he will be available for consultation. It is expected that several physiologists and biochemists of this country will also participate by giving lectures and conducting seminars. Detailed program will be issued later.

No fees will be charged. Credit for attendance by graduate students of this or other universities will be at the discretion of their advisors.

Staff members and students of medical and agricultural schools, physicians, biologists, chemists and all others interested in Physiology and Biochemistry are invited.

Board and lodging at moderate rates will be available. Recreational facilities are abundant in Minneapolis and vicinity. The summer climate is delightful. Bring your automobiles.

This gathering of foreign scholars is made possible by the first American meeting of the International Physiological Congress, in Boston, August 19-23. After the Symposium in Minneapolis, staff and visitors will go on to Boston for the Congress.

George Fahr,
E. P. Lyon,
J. F. McClendon,
F. H. Scott, *Committee.*

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

The annual meeting of the Redwood-Brown County Medical Society was held at Turner Hall, New Ulm, May 22. Twenty-one physicians and four ladies were present. After the banquet at 6:30 p. m. the following program was carried out, presided over by the president, Dr. Geo. Weiser:

1. "Local Anesthesia in Fractures," Dr. Carl O. Rice, Minneapolis.

2. "Quacks in Minnesota," F. Manley Brist, Investigating Attorney for the Minnesota State Board of Medical Examiners.

The secretary read his report of our last annual meeting held June 15, 1928, as well as minutes of special meetings held during the past year, and also the treasurer's report, all of which were adopted as read.

The following officers were elected for the ensuing year:

President, Dr. L. A. Fritchie, New Ulm;

Vice President, Dr. J. W. B. Wellcome, Sleepy Eye;

Secretary-Treasurer, Dr. Wm. A. Meierding, New Ulm.

Delegate to the 1930 State Convention, Dr. Geo. B. Weiser, New Ulm; alternate delegate, Dr. C. Saffert, New Ulm; censor (3 years), Dr. J. C. Rothenburg, Springfield.

The Publicity Committee, consisting of Drs. Weiser, Kiefer and Rothenburg, as well as the Committee on Public Policy and Legislation, consisting of Drs. Rothenburg and Hammermeister, and also the Committee on Maternal and Infant Hygiene, consisting of Drs. Weiser and Jamieson, were left unchanged. As no outside bids were received the president announced that our next annual meeting will again be held in New Ulm.

Dr. Merlyn J. Lindahl of Winthrop was elected to membership.

The meeting adjourned.

Wm. A. Meierding, M.D.,
Secretary.

OF GENERAL INTEREST

Dr. Henry E. Michelson of Minneapolis has returned from a trip to Europe.

A son, William Worrell, was born to Dr. and Mrs. John Berkman, Rochester, Minnesota, Thursday, May 30.

Dr. C. W. Rucker, formerly of the Mayo Clinic, Rochester, has announced the opening of an office at 910 Donaldson Building, Minneapolis.

Dr. H. W. Grant, Saint Paul, has given up his office at 339 Lowry Medical Arts Building, and has joined the Miller Clinic of Saint Paul.

Dr. and Mrs. Frederick A. K. Schaaf of Minneapolis will sail July 19 for Europe, where they will spend the summer traveling in Germany, France, Spain and Italy.

Dr. E. C. Maeder has become associated in the practice of obstetrics and gynecology with Dr. T. W. Weum of Minneapolis at 1011 Medical Arts (Yeates) Building.

Dr. J. J. Heimark has moved from Blue Earth to Fairmont, Minnesota, where he is associated in practice with Drs. Miller, Blanchard and Gardner in the new hospital and clinic building.

Word has been received from Dr. M. R. McQuiggan, formerly of the Mayo Clinic, Rochester, of the opening of an office for the practice of medicine at 1050-1051 Fisher Building, Detroit, Michigan.

Dr. F. H. Magney of Duluth was elected chief of the medical staff of St. Luke's Hospital, Duluth, at the annual meeting held recently, to succeed Dr. D. L. Tilderquist.

Dr. W. J. Marcley of Minneapolis was one of forty men honored at the Atlantic City meeting of the National Tuberculosis Association as founders of the Association in 1904.

Dr. A. R. Anderson, formerly of the Mayo Clinic, Rochester, has been installed as dean of the New York Post-Graduate Medical School, according to an announcement received from New York City.

Dr. and Mrs. F. G. Benn of Minneapolis with their son, Howard Benn, are spending the summer in Europe. They plan to spend the greater part of the time in Vienna and will return some time in September.

Major Henry F. Lincoln, chief of the surgical staff of the Fort Snelling medical corps, will be transferred September 1 to Fort Clark, Texas, a cavalry post. He will hold a position at Fort Clark similar to that at Fort Snelling.

Dr. and Mrs. C. C. Chatterton of Saint Paul, with their two children, Laura and William, have sailed for Europe. Dr. Chatterton will attend a joint meeting of the American and British orthopedic societies in London, England.

Dr. P. J. Hiniker of Hastings has moved to Le Sueur to assume the practice left vacant by the death of Dr. J. E. Le Clerc. Dr. Hiniker practised for two years in Dakota after finishing his internship at St. Joseph's Hospital, Saint Paul.

Miss Anne Swanson, daughter of Mr. and Mrs. H. Hendrickson of Deerwood, and Dr. Gilbert John Leonard of Saint Paul were married in Saint Paul in June. Dr. and Mrs. Leonard will be at home after August 1 at 1640 Randolph Street, Saint Paul.

Dr. A. J. Chesley of Minneapolis, executive officer of the Minnesota State Board of Health, was re-elected secretary-treasurer of the State and Provincial Health Authorities of North America at the forty-fourth annual conference of health officers held in Washington, D. C.

Fewer cases of tuberculosis in children exist in Minnesota than in any other section of the United States or Canada, according to a report given by Dr. E. P. Fenger of Glen Lake Sanatorium at the recent meeting of the National Tuberculosis Association held in Atlantic City.

With the recent celebration of the seventy-fifth anniversary of the founding of Rochester, Minnesota, the fact was brought to light that Rochester has the oldest practising physician in the world, namely, Dr. W. A. Allen. Dr. Allen is 94 years old and still sees his patients daily, driving his own car to visit them.

Mrs. E. M. Hammes of Saint Paul is the newly elected president of the Ramsey County Medical Society auxiliary. Other officers elected are: Mrs. E. C. Gager, vice president; Mrs. A. M. Johnson, recording secretary; Mrs. Karl Dedolph, corresponding secretary; Mrs. Paul Kelly, treasurer; and Mrs. E. A. Meyerding, auditor.

The marriage of Miss Ruth Cantillon, daughter of Mr. E. Cantillon of Los Angeles, California, to Dr. Douglas Parry Head, son of Dr. and Mrs. George Douglas Head of Minneapolis, was solemnized at the home of Mr. and Mrs. E. J. McFarland, Minneapolis, June 18. Dr. and Mrs. Head will make their home in Minneapolis.

In recognition of the fellowship existing between English and American surgeons and to promote better international relationships between the nations, the University of Manchester, England, will confer the honorary degree of doctor of laws on Dr. William J. Mayo and Dr. Charles H. Mayo, July 22. Dr. William Worrell Mayo, father of the two brothers, attended the University of Manchester.

Announcement has been made of the engagement of Miss Lola Labowitz of Minneapolis to Dr. Paul H. Guttman of the University of Minnesota teaching staff. Dr. Guttman is doing research work and teaching in the department of pathology under a Mayo fellowship awarded him upon graduation from Washington University, St. Louis, Missouri.

A farewell dinner attended by one hundred and fifteen members of the faculty of the Mayo Clinic and Foundation was given Dr. Russell M. Wilder April 25,

on the occasion of his leaving Rochester to accept the chair of medicine at the University of Chicago. Dr. Wilder, whose father is a well known ophthalmologist in Chicago, graduated from Rush Medical College in 1912. Before his graduation he did some research work on typhus fever in Mexico City in conjunction with Dr. H. T. Ricketts, who lost his life as a result of the work. Following service in the medical corps during the World War Dr. Wilder went to Rochester, where he devoted his attention to the subject of diabetes. His work in connection with dietary treatment of the disease and later with the use of insulin led to his recognition as an authority on the subject. Dr. Wilder returns to Chicago to head the department of medicine at his alma mater, as Rush has become associated with the University of Chicago.

THE SAMUEL GROSS PRIZE

The Philadelphia Academy of Surgery announces The Samuel D. Gross Prize of $1,500.00. Essays will be received in competition for the prize until January 1, 1930.

The conditions are that the prize "shall be awarded every five years to the writer of the best original essay, not exceeding one hundred and fifty printed pages, octavo, in length, illustrative of some subject in Surgical Pathology or Surgical Practice founded upon original investigations, the candidates for the prize to be American citizens."

It is expressly stipulated that the competitor who receives the prize shall publish his essay in book form, and that he shall deposit one copy of the work in the Samuel D. Gross Library of the Philadelphia Academy of Surgery, and that on the title page it shall be stated that to the essay was awarded the Samuel D. Gross Prize of the Philadelphia Academy of Surgery.

The essay, which must be written by a single author in the English language, should be sent to the "Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgery, care of the College of Physicians, 19 S. 22d St., Philadelphia," on or before January 1, 1930.

Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer. No envelope will be opened except that which accompanies the successful essay.

The Committee will return the unsuccessful essays if reclaimed by their respective writers, or their agents, within one year.

The Committee reserves the right to make no award if the essays submitted are not considered worthy of the prize.

William J. Taylor, M.D.,
John H. Jopson, M.D.,
Edward B. Hodge, M.D.,
Trustees.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

Abbott Laboratories
- Bismarsen

Ciba Co., Inc.
- Digifoline-Ciba
  - Digifoline-Ciba Liquid
  - Ampules Digifoline-Ciba Solution, 1 c.c.
  - Ampules Digifoline-Ciba Solution, 5 c.c.
  - Tablets Digifoline-Ciba
- Isarol-Ciba

Deshell Laboratories
- Petrolagar with Milk of Magnesia

Parke, Davis & Co.
- Diphtheria Toxoid

G. D. Searle & Co.
- Sulpharsphenamine-Searle, 0.1 Gm. Ampules
- Sulpharsphenamine-Searle, 0.2 Gm. Ampules
- Sulpharsphenamine-Searle, 0.3 Gm. Ampules

E. R. Squibb & Sons
- Insulin-Squibb, 80 units, 10 c.c.

Swan-Myers Co.
- Canada Blue Grass Concentrated Extract-Swan-Myers.

Winthrop Chemical Co., Inc.
- Tablets Theocin Soluble, 2½ grains

TRUTH ABOUT MEDICINES

Lenigallol.—Triacetylpyrogallol.—Lenigallol is said to be non-poisonous and non-irritating, but it produces a mild and painless corrosive effect by the gradual liberation of pyrogallol. It is used as a substitute for pyrogallol in psoriasis, lupus, acute and subacute eczema of children and other skin diseases. E. Bilhuber, Inc., New York.

Solution Bismuth Sodium Tartrate-Searle, 1.5 per cent.—An aqueous solution containing bismuth sodium tartrate-Searle (Jour. A. M. A., June 30, 1928, p. 2103) 0.015 Gm., benzyl alcohol 0.02 Gm., and sucrose 0.25 Gm., in one c.c. G. D. Searle & Co., Chicago. (Jour. A. M. A., April 6, 1929, p. 1181.)

Magnesia-Mineral Oil (25) Haley.—A mixture composed of liquid petrolatum, U. S. P., 1 part by volume; magnesia magma, U. S. P., 3 parts by volume. It is used as a lubricant in the intestinal tract for promoting evacuation of the bowel and as an antacid for the gastrointestinal canal. The Haley M-O Co., Inc., Geneva, N. Y.

Sulpharsphenamine-Searle.—A brand of sulpharsphenamine-N.N.R. (New and Non-official Remedies, 1928, p. 81). It is supplied in 0.4 Gm., 0.5 Gm. and 0.6 Gm. ampules. G. D. Searle & Co., Chicago.

Diphtheria Toxin-Antitoxin Mixture (Diphtheria Prophylactic).—A diphtheria toxin-antitoxin mixture (New and Non-official Remedies, 1928, p. 366), each c.c. representing 0.1 L+ dose of diphtheria toxin neu-

tralized with the required amount of antitoxin. It is marketed in packages of three 1 c.c. vials, in packages of one 15 c.c. vial, in packages of one 30 c.c. vial, and in packages of thirty 1 c.c. vials. National Drug Co., Philadelphia. (Jour. A. M. A., April 20, 1929, p. 1349.)

Sulpharsphenamine-Squibb, 0.9 Gm. Ampules.—Each ampule contains sulpharsphenamine-Squibb (New and Non-official Remedies, 1928, p. 84) 0.9 Gm. E. R. Squibb & Sons, New York. (Jour. A. M. A., January 26, 1929, p. 313.)

Dial-Ciba.—Diallylbarbituric acid.—Dial-Ciba differs from barbital (diethylbarbituric acid) in that both of the ethyl groups of the latter are replaced by allyl groups. The actions and uses of Dial-Ciba are essentially similar to those of barbital, but Dial-Ciba is more active than barbital and it is used in correspondingly smaller doses. Fractional doses are used as a sedative and larger doses as a hypnotic. The hypnotic action is induced within one-half to one hour. As a sedative the dosage is 0.02 to 0.04 Gm. two or three times daily; as a hypnotic 0.1 to 0.3 Gm. one-half to one hour before sleep is desired. The product is supplied in powder, in Tablets Dial-Ciba, 0.1 Gm., and as Elixir Dial-Ciba containing 0.05 Gm. per 4 c.c. Ciba Co., Inc., New York. (Jour. A. M. A., March 23, 1929, p. 983.)

Tablets Theocin Soluble, 2½ grains.—Each tablet contains 2½ grains of theocin soluble, formerly called theocin sodium acetate (New and Non-official Remedies, 1928, p. 424). Winthrop Chemical Co., Inc., New York.

Perfringens Antitoxin.—B. Welchii Antoxin.—Anti-Gas Gangrene Serum.—An anaërobic antitoxin (New and Non-official Remedies, 1928, p. 351), prepared by immunizing horses with gradually increasing doses of the toxin of *B. welchii*. The finished product is tested on pigeons by determining the minimum amount necessary to neutralize the M.L.D. of *B. welchii* toxin, the potency being expressed in units. The product is marketed in 100 c.c. bottles of unconcentrated serum containing at least one unit per c.c.; in 50 c.c. bottles of unconcentrated serum containing at least two units per c.c.; and in 20 c.c. syringes of concentrated serum containing at least five units per c.c. H. K. Mulford Co., Philadelphia.

Tetanus-Perfringens Antitoxin Refined and Concentrated-P. D. & Co.—An anaërobic antitoxin (New and Non-official Remedies, 1928, p. 351), prepared from the toxins of *B. welchii* and *B. tetani* by immunizing horses with repeated, gradually increasing doses of tetanus toxin and perfringens (*B. welchii*) toxins until samples from treated animals show one unit or more of tetanus antitoxin per c.c. and one unit or more of perfringens antitoxin per c.c. In addition to use in the treatment of gas gangrene, this product is proposed for use as a prophylactic in conditions such as wounds or contusions in the abdominal tract and as curative in cases of acute peritonitis and obstruction of the small bowel. It is marketed in packages of one syringe containing 1,500 units of tetanus antitoxin and 10 units of perfringens antitoxin. Parke, Davis & Co., Detroit. (Jour. A. M. A., May 4, 1929, p. 1521.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of May 8, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, May 8, 1929. Dinner was served at 7 p. m. and the meeting was called to order at 8 p. m. by the President, Dr. C. N. McCloud. There were 41 members and 2 guests present.

Minutes of the April meeting were read and approved.

The scientific program was as follows:

Dr. H. L. Ulrich (Minneapolis) presented a patient with coarctation of the aorta, and afterward gave the following report of the case:

The patient is 32 years old, married, and has two children. His wife is healthy. He has had nervous symptoms for the last ten years, dyspnea and palpitation for six years, and tremors for one year. The last two years he has been under various physicians. He was sent into the University Hospital with a diagnosis of hyperthyroidism for operation. He was referred to the Medical Service for study. One of my associates had noticed a pulsating vessel on the thorax and the marked blood pressure so unusual in hyperthyroidism. When I was told about him I requested a brachial and popliteal pressure, thinking of coarctation of the aorta. The brachial pressure was 180/110 and the popliteal 120/80. Normally the blood pressures in the two extremities are equal or the lower extremity is the higher.

On physical examination he had a pansinusitis. He showed marked pulsation of the vessels of the neck and tortuosities and thrills. There were pulsating vessels running down the back along the margin of the scapula and one could palpate pulsations in the intercostal along the lower ribs. There was dullness under the sternum. There was a loud systolic murmur in the interscapular area, more marked on the left. He had a tremor of extended hands and a thrill over the thyroid and a basal rate of +43. Superficially he presented the picture of a case of thyrotoxicosis.

One can make a diagnosis of coarctation by feeling of the radial and femoral at the same time. The femoral will have a very weak impulse compared with the radial. Furthermore, by attempting to find pulsation in the abdominal aorta it will be absent or very feeble; thereby placing the obstruction in the thorax.

This is the first case of this kind that I have seen in my medical experience. It has been reported about 200 times at postmortems. Clinically it has been reported 78 times and corroborated by postmortems 21 times. (Ref.: Blackford: Coarctation of the Aorta. Arch. Int. Med., May, 1928. Vol. 41, No. 5, p. 702.)

We tried to see the narrowing of the arch under the fluoroscope but failed. A mass was seen under the sternum which pulsated. The question of a substernal

thyroid or dilated vessel off the arch was not determined. *X*-ray plates were shown which showed the shadow under the sternum. The heart was within normal limits in size, shape, and position. Attention was called to the serrated appearance of the lower borders of the ribs on both sides. This irregularity of the borders is a pathognomonic sign in roentgenology for coarctation. It is probably brought about by the movement of tortuous intercostal vessels. Several plates of the thoracic spine were shown. There was a distortion of the spine due to congenital deformities of the vertebræ. The third and fourth thoracic were fused and the seventh and eighth were very much deformed. There was some deformity of the ribs on the right side secondary to the deformity in the spine. Congenital defects are common with coarctation.

Every young individual with symptoms of hyperthyroidism and hypertension should be examined for this congenital defect. Just why they have symptoms of hyperthyroidism is difficult to say. Is it due to the increased blood supply? Several cases are mentioned in the literature with this syndrome. Resection of the thyroid has been done in several instances.

By coarctation is meant a congenital narrowing at the isthmus of the aorta. The isthmus is situated between the left subclavian and the insertion of the ductus arteriosus. The narrowing may be moderate or complete. To adjust for this obstruction the circulation seeks the collateral route. The commonest form is by way of the branch of the subclavian and intercostal, the flow of blood through the intercostals being toward the spine instead of away from it.

Blackford recently discusses this matter pretty fully, going into the embryological discussion, and concludes that it is a developmental defect. There are two types, the infantile and the adult. They are roughly differentiated anatomically by the site of the narrowing. In the infantile, the narrowing occurs between the left subclavian and insertion of the ductus arteriosus. In the adult, it is at the site of the ductus arteriosus.

In going over the postmortem findings Blackford divides these patients into four great groups, depending on how they die. There is one group that die of cardiac failure; a group that die from rupture of an aneurysm of the arch; a group that die from rupture of the cerebral vessels (there is tremendous pressure in the cerebral vessels); and a fourth group in which there are aplastic conditions in the aorta. There is also a fifth or miscellaneous group on which reports are not very clear. He reports 192 cases all told.

The treatment in this condition is simply rest and reduced effort. In this case Lugol's had been given without results. Rest reduced his metabolic rate to +4. Reduction of infections should also be done. This man now is working every day and feels extremely well.

They usually succumb about the 4th decade, although there have been cases reported dying older than that.

DISCUSSION

Dr. J. S. Gilfillan (St. Paul): I have very little to say about this condition. I have been on the lookout for it for about 25 years but have never yet seen one. The signs here point to an obstruction of the aorta beyond the left subclavian artery. The tumor in the mediastinum may complicate things to a certain extent. The tumor evidently is situated on the arch of the aorta. This appears to be a goiter. I have never heard of the thyroid causing stenosis of this kind. The patient presents the typical signs of coarctation of the aorta and surely has a stenosis.

Dr. E. T. Richards (St. Paul): Dr. Ulrich is to be congratulated on making this diagnosis during life. It is an extremely rare condition—one of the rarest, in fact, that is ever encountered. This case presents beautifully all of the classical features although with the sustained hypertension I am somewhat surprised that he does not show a greater enlargement of the heart.

Dr. Ulrich (in closing): If these patients have large hearts the enlargement is due to valvular defects. I just want to emphasize this one point about the thyroid. One should always differentiate this in young people. The man who looked at this boy with a thyroid and blood pressure was very suspicious that there was something more the matter with him. He had not been looking for coarctation the way I have for years. Way back in 1887 these differential conditions were discussed.

There is a mass under the sternum. Dr. Gilfillan mentions this point as casting some doubt on the diagnosis. He is quite right. There is one case in the literature in which a mass in the thorax reproduced collateral circulation through the neck vessels and lower thoracic aorta. However, in our case the tumor under the sternum is more to the left than to the right and above the aorta. It ought to obstruct the vessels coming off the aorta on the left. Our collateral circulation and pulsations are bilateral, and it is this reason, besides the absence of abdominal pulsation, which makes us think that there is obstruction in the thoracic aorta. Since there is obstruction, the most likely place would make it at some congenital site, namely, the isthmus.

Dr. J. M. Armstrong of the Historical Committee of the State Society showed several articles used by medical men in the early days of their practice, among them being a box of "eye-stones," the first clinical thermometer used in St. Paul, a mechanical phlebotomy knife, and he also showed a photograph of the first physician who came to St. Paul.

Dr. C. B. Wright (Minneapolis) showed a specimen from a case of aortic aneurysm which he had reported briefly at a previous meeting. Following is the complete case report:

The patient was 47 years old. His family history was negative. He had been married seventeen years and his wife is living and well. There are two children, fourteen and sixteen years of age, living and well. There was no history of venereal infection.

The patient had always been well until November,

1928, when he contracted a respiratory infection with fever and cough, for which he was in bed five days. Following this he had had some pain in his left side which he thought was pleurisy. With the exception of these five days he had been able to follow his occupation of handling an automatic riveting machine.

On February 2, 1929, while at work he was seized with an agonizing pain in the epigastrium which radiated to the right side. It was considered an acute gallbladder colic by the doctor who saw him at that time. Later the pain radiated to both sides and back. About one week later he lost his voice and had some cough with several slight hemoptyses. He came to the hospital February 25, 1929.

On examination his breathing was rapid, he was suffering extreme pain, which he said was now located over his left precordium. The left radial pulse could not be felt and there was marked decrease in the left carotid. There was marked precordial pulsation, more marked to the right of the sternum, visible from the second to the sixth interspace. There were signs of compressed lung over the right upper lobe. Litten's sign was very definite on the right side and absent on the left. There was marked lagging on deep breathing of the left costal margin. Fluoroscopic examination showed a large mediastinal tumor 10 cm. in diameter which pulsated. The left diaphragm was paralyzed and the heart was almost entirely on the right side, being markedly displaced with the mediastinum. The left vocal cord was paralyzed. The Wassermann was plus 4.

The striking points in this case are the sudden onset with agonizing abdominal pain simulating an acute abdominal condition, the pain after ten days shifting to the left precordium, the marked displacement of the mediastinum with impalpable radial and weak carotid pulse on the left side, the paralysis of the left vocal cord, and the paralysis of the left diaphragm shown clinically by the absence of Litten's sign and the lagging of the costal margin on the affected side on deep breathing.

The patient left the hospital on March 25, 1929, comparatively free from pain, although the physical signs were unchanged. On April 15 his pain returned, gradually becoming more severe, and on April 16 he died suddenly.

The postmortem findings by Dr. Lawrence Larson were as follows:

"There is a large aneurysm of the arch of the aorta measuring 17 x 15 x 12½ cm. It is formed mainly at the expense of the left lateral wall of the aorta where it has perforated into the left pleural cavity through an opening about 1 cm. in diameter. It projects into the left pleural cavity, almost reaching the right chest but not nearly so extensively as on the left. The content of the sac is made up of laminated thrombus, some areas being older than others. The thrombus extends proximally into the aorta, nearly reaching the aortic valve. The dilatation does not involve the root of the aorta, the aortic valves being apparently competent. The aneurysm has eroded the anterior surface of the bodies of the vertebræ from the seventh to the tenth thoracic level. The intervertebral discs have for the most part remained unattacked."

The two things of unusual interest in this case are the sudden onset with epigastric pain radiating to the right side, simulating a gallbladder attack, and, second, the enormous size of the aneurysm.

Dr. Frederic E. B. Foley (St. Paul) then read his inaugural thesis, entitled "New Methods for Exposure of the Kidney and for Nephropexy." Lantern slides were shown.

DISCUSSION

Dr. Oscar Owre (Minneapolis): I have listened with a great deal of pleasure to Dr. Foley's presentation. I have reviewed the literature on exposure of the kidney quite thoroughly and feel very certain this is original. Dr. Foley has explained his method to me on one or two occasions and some ten days ago I exposed a tuberculous kidney in this manner and was very much surprised at the ease with which the kidney could be delivered. I am sure that this method of approach has tremendous advantages over the older technic. It seems to me that the real value of this is the fact that you can investigate the vascular pedicle and the pelvis with greater facility than with the old exposure.

As to fastening the kidney to the renal fossa, I can see how this method would be much more likely to succeed while others would fail. For years I have been astonished at the great number of kidneys that become loose after having been fastened up. Some years ago I saw a woman upon whom Dr. Frederic Treaves had done a double nephropexy and was very much surprised to find that both kidneys were down in the abdomen and I thought if he couldn't do it I could not expect to accomplish it. I feel quite sure that most of the kidneys fastened in the usual way, such as decortication, partial or full, and depending upon the capsule fastened to the rib, etc., etc., fail. I have become a pessimist on the advantages of nephropexy. Dr. Foley's method leaves the capsule intact and the kidney is fastened in the renal fossa against the clean muscles of the back. As I witnessed him do it, I think it ought to succeed, as all intervening fatty tissue is stripped away. I believe all of Dr. Foley's cases have stayed up; however, I do not feel that one can say that these kidneys will stay up indefinitely because not enough time has elapsed to be certain about it. Yet it appears to offer the best hope of success.

I want to congratulate and compliment Dr. Foley.

Dr. H. B. Zimmermann (St. Paul): I believe Dr. Foley's method of exposing the kidney is the best I have ever tried. There is one part of the technic that if Dr. Foley mentioned he did not bring out very clearly. Before the incision is made into the perirenal fascia the peritoneum is pushed away from the transversalis fascia toward the midline, away from the anterior abdominal wall. This allows the peritoneum,

with its adherent fatty mass, to drop into the abdomen by gravity. From then on the intra-abdominal contents do not get in the way.

Dr. A. C. Strachauer (Minneapolis): Nephropexy, some dozen or more years ago, fell into disrepute because of its very frequent and unnecessary performance for gastrointestinal conditions, principally Glenard's disease, which is, of course, never benefited thereby. A loose kidney is a common accompaniment of general visceroptosis, and the fixation of such a kidney will not relieve the gastrointestinal symptoms of Glenard's disease. Intermittent hydronephrosis, distinct attacks of Dietl's crisis, call for the performance of nephropexy, and this operation when definitely indicated and properly performed has given as much satisfaction as any type of operation with which I am familiar.

The operation that Dr. Foley has described I am confident will give satisfaction, since it complies with the requirements of success for nephropexy, in that the kidney, without the interposition of fat, is fastened in direct contact to fascia and muscle. Following the technic of Israel, I have removed the offending perirenal fat and have fastened the completely decapsulated kidney to muscle and fascia, and the results have been eminently satisfactory.

Dr. A. E. Benjamin (Minneapolis): There is one point in technic which I carried out a number of years ago in connection with this operation. That was, to decapsulate a portion of the kidney by dissecting the capsule from the center posterior line, making two flaps about 1.5 inches wide, dissecting one upward toward the upper pole and one downward toward the lower pole, and then putting each flap between the muscle fibres. The kidney would then come right in contact with the muscle tissue. The kidney would stay in place; none of them dropped. Of course, at that time we were operating more cases. Where there is a hydronephrosis from a kinked ureter and a dropped kidney I believe this operation is indicated.

Dr. Foley: I have nothing more to add except to thank the men for their discussions. I am glad to know that some of the members have used this method and found it satisfactory.

As a result of the formal ballot, the following men were elected to membership in the Academy:

Honorary Membership (from Active): Dr. F. A. Dunsmoor and Dr. R. E. Farr, both of Minneapolis.

University: Dr. W. A. O'Brien.

Active: (Minneapolis) Drs. W. E. Camp, James Johnson, Martin Nordland, E. C. Robitshek, and A. A. Zierold. (St. Paul) Drs. Harold Hullsiek and George Ruhberg.

The meeting adjourned.

Carl B. Drake, M.D.
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
205 W. 2nd STREET, DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

UNDERLYING DISTURBANCES OF METABOLISM OF THE NERVOUS CHILD: H. C. Cameron (Brit. Med. Jour., Feb. 2, 1929, No. 3552). Metabolic processes in children are less stable than in later life. The nervous child is especially prone to develop metabolic derangements, such as acidosis, tetany, convulsions, urticaria, et cetera. The attacks of pallor, prostration, and vomiting, so common to the nervous child, may be due to temporary suprarenal insufficiency, thus causing glycopenia. Ketosis is a frequent occurrence, due to failure to maintain an adequate supply of carbohydrate, for complete fat metabolism. Lack of resistance to infection is usually observed, and even trivial infections become severe, due to the acidosis which generally accompanies them. Mucous colitis, and bronchial asthma may likewise be expressions of such metabolic disturbances.

It is suggested that a minimum of fat be included in the regular diet, and an increase in sugars and starches be provided. A small daily dose of alkali is also beneficial.

Thomas Myers, M.D.

OCCUPATIONAL THERAPY IN A TUBERCULOSIS SANATORIUM: C. Bush, M.D. (Occupational Therapy and Rehabilitation, 1929, VIII, 95). Occupational therapy from the standpoint of the treatment of tuberculosis in institutions is, according to the writer, a prime necessity. It is too often honored in the abuse rather than in the use, however. Occupational therapy may be termed the "digitalis" therapy of tuberculosis. It must be hedged about with therapeutic directions that are carefully carried out. If not, occupational therapy defeats its own purposes. The occupational therapy aide is apt to base her judgment and ideas on such non-essentials; and only too apt are the

patients to lose sight of the rôle such work plays in the attainment of their ultimate goal.

Occupational therapy serves two purposes that are fundamental in a tuberculosis sanatorium.

1. It acts as a mental diversion and therefore a nerve sedative and as such is an aid to prolonged rest treatment.

2. It serves as a test for the limit of energy expenditure to which each patient may go without harm to himself.

The occupational therapy department, as far as best administration is concerned, should not be confined in its activities. It should cover all types of work done by the patients while in the institution.

There is no doubt that in treating patients with tuberculosis in insitutions it is always wise to begin thinking and planning for the patients' eventual rehabilitation in industry and home life at the time of their discharge. Thus study courses in English, accounting, typewriting, arithmetic, et cetera, are all of benefit, and can again, as far as the sanatorium is concerned, be considered occupational work. The obtaining of occupational therapy aides capable of carrying on this varied type of work is the most serious problem.

Wherever possible the patients should receive some remuneration for their work, as a psychological incentive. If their products are salable, they should have a percentage of their sales. Very careful bookkeeping should be done. We, however, have not arrived at the happy day when occupational expense can be considered part of the medical treatment. The treatment of tuberculosis has been recently divided into three stages for the sake of charity: (1) the stage of absolute rest; (2) the stage of supervised rest and exercise, and (3) the stage of rehabilitation, supervised work.

In the first of these stages rest must needs be rigidly enforced, nevertheless occupational therapy enters into this stage in certain cases. Where light hand work for a few minutes twice a day soothes the patient it should be used. Where brief study periods or writing periods occupy the mind they are beneficial. Occupational work should never be used in this period, however, without a definite medical indication for it.

In the second stage lies the great field for occupational therapy. This should be used with light work first, gradually beginning a half hour a day and working up hour by hour as the patient shows ability to go on. It is here that the tendency to overwork the patient comes in. The patient usually feels well enough to do more than his condition warrants and is himself the great offender. Time must be strictly limited by the physician and the occupational aide must see that the time is strictly followed. No patients should be forced to do any particular kind of work. Making any type of occupational work compulsory naturally arouses antagonisms, but the patients are given to understand that they must do some kind of work to test their limit of energy expenditure, and that they may choose that which they like to do. This freedom of choice creates interest.

A. T. Laird, M.D.

THE TREATMENT OF TINEA OF THE SCALP WITH THALLIUM SALTS: V. Pardo-Castello et al. (Archives of Dermatology and Syphilology, March, 1929, Vol. 19, No. 3, Page 409). The oral administration of thallium acetate in doses of 7 to 8 mg. per kilo of body weight produced complete alopecia of the scalp within twenty-one days. The hair regrows in in from twenty-two to forty-nine days after taking the thallium. If the loosened dead hairs are thoroughly removed, the new hairs are usually free from infection.

Hair in the eyebrows and other parts is not affected by thallium. The treatment cannot be administered after the age of fourteen, as toxic symptoms are produced, such as diarrhea, pains in the legs, pallor. Similar transitory symptoms may occasionally occur in younger children as well, without interfering with the treatment.

It is believed that the fall of hair caused by the administration of thallium is due to temporary dysfunction of the thyroid gland. Endocrine changes make the treatment inadvisable after puberty begins.

The treatment compares favorably with epilation as produced by x-rays, but must be used cautiously, as thallium is a toxic drug; for this reason the x-ray, properly used, is the method of choice.

Thomas Myers, M.D.

SURGERY

SUPERVISORS:

DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

CONGENITAL VALVULAR OBSTRUCTION OF THE PROSTATIC URETHRA: Hugh H. Young and Robert W. McKay (Surg., Gynec. and Obst., Apr., 1929, Vol. XLVIII, No. 4, 509-535). The authors report twenty-one cases of congenital valve of the posterior urethra which have been seen at the Brady Urological Institute. Fifteen of these patients have been operated upon successfully.

The following things are stressed: the importance of a complete urological examination and a careful history; the search for a dilated bladder, ureters and kidney pelves; the necessity of blood chemistry, if valvular obstruction and renal impairment are suspected; delicate instrumentation to detect the valvular obstruction; careful efforts to find the aperture between the valves by

means of pointed ureteral catheters in order to drain the bladder; the necessity of gradual decompression to avoid shock, uremia, et cetera; the use of the cystoscope or urethroscope and cystogram to demonstrate the valvular obstruction; the dilated prostatic urethra above it; the dilatation of the bladder, ureters and kidney pelvis into which the fluid usually flows by reflux; the necessity of careful preliminary treatment before operation is undertaken; the great advantage of the punch operation, with minute instruments especially prepared to fit the caliber of the urethra.

JOHN R. HAND, M.D.

PERINEPHRITIC ABSCESS: A. H. Peacock, M.D., F.R.C.S., Seattle, Wash. (Surg., Gynec. & Obstet., 757, June, 1929). The chief object of this paper is consideration of the question of diagnosis. The classification of perinephritic abscesses used by Hunt (1924) is best suited.

1. Renal
2. Extrarenal.

The etiology of abscess of renal origin is more easily comprehended as we generally have demonstrable infection of the urinary tract. This type forms beneath the renal capsule posteriorly, rarely anteriorly.

Perinephritic abscess of extrarenal origin seldom shows pathology of the urinary tract. Urine, smears, cultures are negative and there are no renal symptoms. Often in these cases it is possible to get a history of furunculosis the preceding two or six weeks. Staphylococcus aureus is the usual type of bacteria cultured from the pus; the infecting agent being borne via the blood or lymph stream.

The age of incidence widely varies, but males are more frequently affected than females, due to cutaneous infection from trauma.

The main points of diagnosis in perinephritic abscess are:

1. Constant fever, mild chills and sweating.
2. Severe pain localized in the costovertebral angle.
3. High leukocytosis—usually higher than one would expect for the degree of fever present. An average of around 20,000 is not uncommon.
4. Curvature and rigidity of the spine.
5. Stereoscopic roentgenogram showing displacement of the kidney and ureter anteriorly or laterally, due to a retrorenal or retroperitoneal mass.

CHARLES W. MAYO, M.D.

ERGOSTEROL AND CATHODE RAYS

It has been shown that the high voltage cathode rays developed by Coolidge also many transfer antirachitic potency to ergosterol and substances containing it. The experiments showed that this sterol exposed to cathode rays is not rendered as potent as when subjected to ultra-violet irradiation from a mercury vapor quartz lamp. These experiments indicate that the antirachitic properties produced by cathode rays are not due to exposure to ultra-violet radiation produced by the rays themselves. (Jour. A. M. A., March 9, 1929, p. 810.)

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

THE USE OF SCARLET FEVER ANTITOXIN: N. T. Welford, M.D. (Amer. Jour. of Dis. of Children, March, 1929, Vol. 37, No. 3, Page 553). Only those patients who had been given antitoxin on or before the fourth day of the disease were considered as having been treated with serum. Each patient was classified clinically on admission as having a mild, a moderately severe or a severe case of scarlet fever. The severity was dependent on the degree of toxemia. In determining this factor, the appearance of the throat proved to be the most reliable index.

Patients with an early profuse purulent nasal discharge frequently showed a considerable degree of toxemia and were classified as having severe scarlet fever.

Approximately 60 per cent of the cases classified as severe showed some improvement following the use of scarlet fever antitoxin. In the mild and moderate types, definite improvement could not be determined following the use of antitoxin.

In this series of cases, apart from the severe cases, scarlet fever antitoxin seemed to play little, if any, role in lessening the number or the severity of the complications.

The scarlet fever antitoxin not uncommonly produced seroreactions, and in some instances produced symptoms of greater severity than the disease for which the antitoxin was used. Of 217 patients treated with serum, 60, or 27 per cent, developed urticarial rashes. Nineteen, or 9 per cent, showed severe generalized seroreactions.

Convalescent serum has given rather striking results in lessening the toxic manifestations and has proved somewhat more reliable than scarlet fever antitoxin.

The mortality rate based on severe cases only in the group that did not receive antitoxin was almost double that of the group in which scarlet fever antitoxin was used.

R. N. ANDREWS, M.D.

THE SALTS OF MERCURY IN THE TREATMENT OF EDEMA IN CHILDREN: W. L. Funkhouser, M.D. (Arch. of Ped., Vol. XLVI, No. 3, March, 1929). The control of edema has always been difficult, both in adults and children.

Novasurol is sodium oxymercuri-o-chlorophen-oxyl-

acetate with diethylbarbituric, a non-ionizable salt containing 33.9 per cent mercury, and is used in 10 per cent neutral sterile solution.

Keith and Whalen found that novarsurol injected into normal individuals caused an increased excretion of chlorids in the urine with both a relative and an absolute increase in the output of sodium. There was no change in the hydrogen ion concentration, in the excretion of potassium, phosphates, urea, ammonia, or total nitrogen. Blood and serum analysis showed no constant change in the concentration of hemoglobin, chlorid, sodium, potassium, calcium, or phosphates. The combining power of CO_2 was within normal limits.

After the injection of novasurol, Hassencamp reported an output of 11,500 c.c. of urine. The chlorids were found increased both in total quantity and concentration. There was no alteration in the total nitrogen excreted. His conclusion was that the fluid and salts were first transferred to the blood from the tissues and excreted by the kidneys and that the action of these mercury salts was therefore on the extrarenal tissues.

Crawford and McIntosh summarized their results after the administration of novasurol: a marked increase in chlorids, a slight fall in the chlorid content of the plasma, a transient fall in the blood protein concentration, and a slight reduction of the chlorids of the edema fluid.

It is of interest to note that beneficial results have been obtained without any bad after-effects or damage to the kidney.

The prolonged use of these salts may cause gingivitis, stomatitis, or colitis, a very natural sequela to the large or prolonged administration of any mercurial preparations.

The conditions for which these salts of mercury may be used are edema when associated with cardiac disease, cirrhosis of the liver, polyserositis, polycythemia, and Banti's disease. The contraindication would be any acute inflammatory process or structural damage to the kidneys, such as an acute edematous nephritis. The dose of novasurol and salyrgan is the same, ½ to 1 c.c. It is not advisable to give the drug oftener than every fourth day.

AOLAN

Aolan is prepared from milk freed from fat, and is claimed to be a germ-free and toxin-free solution of lactalbumin. It consequently contains protein foreign to the human body and its injection on that account may be fraught with the danger of violent reactions, especially in so-called hypersensitive persons. The Council on Pharmacy and Chemistry has declared Aolan inadmissible to New and Non-official Remedies because it is marketed on unwarranted therapeutic claims. (Jour. A. M. A., May 25, 1929, p. 1783.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

THE PHYSIOLOGY OF LOVE. George M. Katsainos, Ph.D., M.D. 326 pages. Cloth, $4.00. Boston: Privately printed by the author, 1929.

NEW AND NON-OFFICIAL REMEDIES, 1929, containing descriptions of the articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1929. Cloth. Price, postpaid, $1.50. Pp. 488; xlviii. Chicago: American Medical Association.

This book offers a solution to the problem of the busy physician who is daily importuned by "detail" men to try the thousand and one new preparations brought out by enterprising manufacturers of pharmaceuticals. If the preparation in question is not described in New and Non-official Remedies, it is quite safe to refuse to try it, no matter how alluring the salesman's talk. The book contains descriptions of those new preparations which, after painstaking examination, the Council on Pharmacy and Chemistry has found worthy of recognition and of trial by the medical profession. It is revised each year to bring it up to date with the best medical thought and to include the new preparations that have been recognized during the year as well as to delete those which have been found not to live up to their promise of therapeutic value.

In this edition there appears for the first time an article on liver preparations and their therapeutic use. The articles on ergot, metallic peroxides, pituitary gland, and radium and radium salts have been considerably revised. Among the new preparations which have been included in this edition are: diphtheria toxoid, which is the toxin of diphtheria so modified by treatment with formaldehyde as greatly to reduce its toxicity yet preserving its antitoxic power; metrazol, another proposed substitute for camphor; liver extract No. 343 and concentrated liver extract-Armour, for the treatment of pernicious anemia. Other newly accepted articles are: bismuth sodium tartrate-Searle, another water soluble bismuth tartrate preparation; scarlet fever toxin-P. D. & Co., another scarlet fever toxin manufactured under lease of the Scarlet Fever Commission; parathyroid hormone-Squibb, standardized by the method of J. B. Collip, and paroidin, made and standardized by the method of A. M. Hanson, both being solutions of the active principle or principles of parathyroid gland for appropriate clinical use. An important deletion is the omission of all generators charged with radium.

A new departure in this edition is a list of "ex-

empted" articles. This comprises some hundred and thirty medical and non-medical products examined by the Council and found to be of such composition and to be so marketed as not to require acceptance or rejection by the Council under its rules.

A section of the book (brought up to date each year) gives references to proprietary articles not included in New and Non-official Remedies. This list, in conjunction with the book proper, constitutes a cumulative index of proprietary medicine, which physicians may consult when a proprietary product is brought to their attention. Physicians cannot dispense with the use of the newer remedies that are brought out each year; they can neither judge them on the basis of the manufacturers' claims nor have they the time or means to determine their merits for themselves. For this reason, every physician should possess a copy of this volume, which annually puts at his disposal an authoritative, up to date, and unbiased estimate of these preparations.

NORMAL DIET. W. D. Sansum, M.D. Second Edition. 136 pages. $1.50. St. Louis: C. V. Mosby Co. 1927.

This second edition of "The Normal Diet" embodies, as did the first edition, a brief outline of diet fundamentals and would be of greater interest probably to the patient than to the physician. The volume is very brief and concise and has a definite message for both.

L. R. Critchfield, M.D.

DIABETIC MANUAL FOR PATIENTS. Henry J. John, M.D. 202 pages. Illus. $2.00 St. Louis: C. V. Mosby Co., 1928.

This small volume is suitable as a guide for the diabetic person or the one who prepares his food. There are brief chapters dealing with history, causes, and management of the condition. Detailed instructions regarding the use of insulin and very complete but simple dietary charts add to its value as a guide for the diabetic.

L. R. Critchfield, M.D.

RECENT ADVANCES IN CHEMISTRY IN RELATION TO MEDICAL PRACTICE. W. McKim Marriott, B.S., M.D. 141 pages. Illus. $2.50. C. V. Mosby Co. 1928.

This series of lectures collected and published in book form should be of great value especially to the practitioner of medicine.

The author is fully conversant with biological chemistry and its relationship to medicine. Recent well defined advances in this field have aroused our interest anew to the importance of a thorough understanding of the chemical processes which make for proper functioning of the human body.

Dr. Marriott's little book is concise, clear, and definite, serving to broaden our knowledge as well as stimulate our interest anew in the fascinating field of body chemistry.

L. R. Critchfield, M.D.

TEXT-BOOK OF UROLOGY, For Students and Practitioners. Daniel N. Eisendrath, M.D., Attending Urologist Michael Reese and Chicago Memorial Hospitals; Assistant Professor of Surgery (Genito-Urinary), Rush Medical College of the University of Chicago; and Harry C. Rolnick, M.D., Associate Urologist Mt. Sinai Hospital; Adjunct Urologist Michael Reese Hospital; Formerly Associate in Genito-Urinary Surgery, Northwestern University Medical School. 942 pages. 711 illustrations, 11 in colors. Price $9.00. Philadelphia and London: J. B. Lippincott Company, 1928.

This volume aims to present, for the general practitioner and medical student, the entire field of urology including the male genitalia, in the simplest possible manner, and still without the omission of any subjects coming within this field. By utilization of methods used by the authors in their teaching, an unusual and interesting volume has been produced. There is a free use of large heavy type through the entire volume for the purpose of emphasis. This helps in the use of the book as a reference work, but makes it a little harder to read. The unusually large number of illustrations is a great advantage. These include diagrams, sketches, photographs and roentgenograms. No previous knowledge is taken for granted; almost everything is illustrated from the simplest instruments and apparatuses to the steps of the most complicated operations. The greater emphasis, however, is laid on the procedures which may be carried out by general practitioners. The 912 pages of text are divided into 7 sections and 59 chapters. The index covers about 30 pages of small type, adding to the value as a reference book.

This work is certainly different from the usual textbook of urology. It seems to the reviewer that it fulfills its aim better than other texts he has seen.

Theodore H. Sweetser, M.D.

REPORT MINNESOTA STATE BOARD OF MEDICAL EXAMINERS, APRIL, 1929

BY EXAMINATION

NAME	SCHOOL AND DATE OF GRADUATION	ADDRESS
Alexander, Harlan Alfred	U. of Minn., M.B., 1929	New Asbury Hospital, Minneapolis.
Bascom, Kellogg Finley	U. of Minn., M.B. and M.D., 1929	28th and Toledo Ave., St. Louis Park, Minn.
Bendix, Lester H.	U. of Minn. M.B., 1928	General Hospital, Minneapolis.
Boardman, Dalmon Virgil	U. of Minn., M.D., 1929	University Hospital, Minneapolis.
Bray, Philip Noyes	U. of Minn., M.B., 1929	General Hospital, Minneapolis.
Brusegard, James Frederick	U. of Colorado, M.D., 1928	General Hospital, Minneapolis.
Burke, Richard Michael	U. of Minn., M.B., 1928	Glen Lake Sanitarium, Oak Terrace, Minn.
Chernack, Morris J.	U. of Minn., M.B., 1929	322 13th Ave S.E., Minneapolis.
Clark, Howard Elton	U. of Minn., M.B., 1928	Swedish Hospital, Minneapolis.
Colp, Edward Adams	Tufts, M.D., 1928	St. John's Hospital, St. Paul.
Ederer, John Joseph	U. of Minn., M.B., 1929	Oak Terrace, Minn.
Farrell, Hubert James	Marquette, M.D., 1928	Mayo Clinic, Rochester, Minn.
Fetterly, Warren	U. of Minn., M.B., 1929	2740 Cedar Ave. S., Minneapolis
Fischer, Viola Ingeborg	U. of Minn., M.B., 1928	General Hospital, Minneapolis.
Fogelberg, Emil J.	U. of Minn., M.B., 1929	Midway Hospital, St. Paul.
Gallagher, Henry Fry	U. of Minn., M.B., 1928	General Hospital, Minneapolis.
Guldseth, Gustav J. S.	U. of Minn., M.B., 1928; M.D., 1929	3445 17th Ave. S., Minneapolis.
Hallock, Philip	U. of Minn., M.B., 1928	General Hospital, Minneapolis.
Hanson, Edwin Carlton	U. of Minn., M.B., 1929	Fairview Hospital, Minneapolis.
Hardeman, Daniel Robert, Jr.	U. of Arkansas, M.D., 1927	Mayo Clinic, Rochester, Minn.
Hedberg, G. Arvid	U. of Minn., M.B., 1929	St. Mary's Hospital, Duluth, Minn.
Hillyard, Lorin V.	U. of Calif., M.D., 1928	Mayo Clinic, Rochester. Minn.
Hoeper, Philip G. E.	U. of Minn., M.B., 1929	Swedish Hospital, Minneapolis.
Hunt, Arthur Bishop	U. of Minn., M.B., 1929	329 Union St. S.E., Minneapolis.
Johnson, Harry Alvin	U. of Minn., M.B., 1928	Swedish Hospital, Minneapolis.
Learmonth, James R.	Glasgow Univ., M.B., 1921	Mayo Clinic, Rochester, Minn.
McIver, Bert A.	U. of Minn., M.B., 1928; M.D., 1929	Lowry, Minnesota.
Maly, Henry Wendell	Creighton, M.D., 1925	Glen Lake Sanitarium, Oak Terrace, Minn.
Mason, James Bryant	U. of Pa., M.D., 1925	Mayo Clinic, Rochester, Minn.
Montgomery, Jimmie Ethel	U. of Minn., M.B., 1928	Bethesda Hospital, St. Paul.
Moore, Claude	U. of Va., M.D., 1916	Mayo Clinic, Rochester, Minn.
Nabers, Luke Waldrep	U. of Cincinnati, M.D., 1924	Mayo Clinic, Rochester, Minn.
Nelson, Oscar Leroy	U. of Minn., M.B., 1928	1318 Monroe St. N.E., Minneapolis
Olsen, Edward George	U. of Minn., M.B., 1928; M.D., 1929	3106 Pierce St. N.E., Minneapolis.
Oppen, E. Gerhard	U. of Minn., M.B., 1929	Fairview Hospital, Minneapolis.
Palomeque, Emilio Jose	U. of Pa., M.D., 1923	Mayo Clinic, Rochester, Minn.
Platt, Frank Bertram	U. of Edinburgh, M.B., 1928	945 Lincoln Ave., St. Paul.
Schaefer, Joseph Francis	St. Louis Univ., M.D., 1925	Mayo Clinic, Rochester, Minn.
Scott, Douglas Edmund	U. of Toronto, M.B., 1924	Mayo Clinic, Rochester, Minn.
Shong, Geneva Loretta	U. of Minn., M.B., 1928	15 E. Victoria St., Duluth, Minn.
Walker, Maurice Andrew	Rush, M.D., 1928	Mayo Clinic, Rochester, Minn.
Wolff, Herman Julius	U. of Minn., M.B., 1929	University Hospital, Minneapolis.

BY RECIPROCITY

Ball, Ralph G.	U. of Kansas., M.D., 1927	Mayo Clinic, Rochester, Minn.
Bradley, John Warwick, Jr.	School of Medicine U. of Iowa, M.D., 1927	855 1st St. S.W., Rochester, Minn.
Copeland, Murray Marcus	Johns Hopkins, M.D., 1927	Mayo Clinic, Rochester, Minn.
Hookey, John Arlington	U. of Mich., M.D., 1924	117 6th Ave S.W., Rochester, Minn.
Huffington, Herbert L.	Northwestern, M.D., 1920	Earl Clinic, Lowry Medical Arts Building, St. Paul.
Kirklin, Byrl Raymond	Ind. Univ., M.D., 1914	Mayo Clinic, Rochester, Minn.
Kreuzer, Titus Charles	Marquette, M.D., 1927	New Richland, Minn.
Love, J. Grafton	U. of Pa., M.D., 1927	Mayo Clinic, Rochester, Minn.
McLane, William Otrey	Rush, M.D., 1928	22 Oak St., Minneapolis.
Mayo, Joseph Graham	U. of Ia., M.D., 1927	Mayo Clinic, Rochester, Minn.

NATIONAL BOARD CREDENTIALS

Bartels, Elmer Clarence	U. of Ill., M.D., 1928	Mayo Clinic, Rochester, Minn.
Childrey, John Howard	Med. Coll. of Va., M.D., 1926	Mayo Clinic, Rochester, Minn.
Gray, Howard Kramer	Harvard, M.D., 1927	825 5th Ave. S.E., Rochester. Minn.
Pfunder, Malcolm C.	Rush, M.D., 1920	Miles City, Mont.
Priestley, James T.	U. of Pa., M.D., 1926	Mayo Clinic, Rochester, Minn.
Wilbur, Dwight Locke	U. of Pa., M.D., 1926	Beverly Apts., Rochester, Minn.

WANTED—Salaried appointments for Class A Physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Aznoe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

BETHANY HOSPITAL, 3701 Bryant Avenue South, Minneapolis, is equipped to care for limited number of maternity cases at a nominal fee. New building. Light, airy rooms. Good food. Call Colfax 0016 or in person at above address.

WANTED—Young doctor to locate in established office, share reception room with dentist. Dentist has large practice. Fine opportunity for an up and going doctor. Write C. C. Gerber, Arcade and Case Streets, Saint Paul, Minn., or call Tower 7340.

FOR SALE—On account of poor health will sell my entire office equipment, all kinds of instruments, appliances, *x*-ray, electrotherapeutic outfits, microscopes, scales, etc. For further particulars, address D-25. care MINNESOTA MEDICINE.

DOCTOR'S AND DENTIST'S OFFICE FOR RENT—Established business and good location above drug store. Rent free to start. Address H. Harris, corner Thomas and Hamline, Saint Paul, Minn.

SANITARIUM FOR SALE OR RENT—Modern building, 20 bedrooms, in North Central Wisconsin, near the northern lake park zone. Address D-26, care MINNESOTA MEDICINE.

FOR SALE—One Standard Type "D" *X*-Ray Generator, Alternating Current, Tube Stand, Coolidge Tube, Vertical Fluoroscope and Accessories, perfect working order. Price, $625.00. Address D-2, care MINNESOTA MEDICINE.

MEDICAL TECHNICIAN desires position in Twin Cities. Four years' experience. Also *X*-Ray, Basal Metabolism and Medical Stenography. Address D-24, care MINNESOTA MEDICINE.

FOR SALE—Practice in southwestern Minnesota. Will sell for price of equipment. Good opening. Competition right. Address D-20, care MINNESOTA MEDICINE.

REGISTERED NURSE AND SECRETARY desires position in doctor's office. Have some knowledge of laboratory routine. Capable of assuming responsibility. Write Agnes M. Peterson, R. N., 1520 Park Avenue, Minneapolis. Telephone Atlantic 1021.

WANTED—Young physician, graduate of Class A school to assist an established physician, town of 3,000; hospital facilities and large rural practice. Catholic preferred. Start on salary with partnership in view if services are satisfactory. Excellent opportunity for the right man. Address D-28, care MINNESOTA MEDICINE.

FOR RENT—Desirable space in Physicians and Surgeons Building, Minneapolis. Group of 4 doctors and 1 dentist. Address D-29, care MINNESOTA MEDICINE.

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MINNESOTA MEDICINE

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THE MORE COMMON INTESTINAL PARASITES OF THE NORTHWEST*

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A CONSIDERATION of intestinal parasites which are most frequently encountered throughout the Northwest involves that of the various types of amebæ, flagellates and the beef and fish tapeworms. Round worms are infrequently seen in this section and the pork tapeworm (*Taenia solium*) is almost extinct here. Pin worms (*Oxyuris vermicularis*) must be fairly common, especially in children living under unsanitary conditions. Trichina, like the pork tapeworm, occurs infrequently; this is due to vigilance in teaching people not to eat raw or smoked pork. Only one ciliate need be mentioned, and that more for completeness, namely, the *Balantidium coli.* This parasite is common in hogs. Only seven cases of infestation with this parasite have been seen in the clinic.

There has been increasing appreciation of the distribution of *Endameba histolytica,* but with this has come even greater confusion as to the significance of non-pathogenic amebæ and flagellates. The parasites which have given rise to this confusion are *Endameba coli, Endolimax nana, Endolimax williamsi, Trichomonas hominis* and *Chilomastix mesnili.* Another flagellate which seems to furnish more tenable grounds for differences of opinion as to its significance is *Giardia lamblia.*

As a basis for study, I reviewed the cases seen in The Mayo Clinic during the first six months of 1928, in which any type of ameba or Giardia was identified. There were 184 cases, of which. in eighteen cases, infestation was with *Endameba histolytica,* in ninety-eight with *Endameba coli,* in thirty-nine with *Endolimax nana,* in fifteen with both *Endameba coli* and *Endolimax nana,* and in fourteen with Giardia. This is no indication of the incidence of the various parasites. The group of 184 cases is selected inasmuch as examinations of stools or suitable studies were undertaken in an investigation of various abdominal complaints.

There were thirty-three patients whose complaint on admission was of steady diarrhea, and seventy-three patients whose complaint, or one of whose complaints, was of intermittent diarrhea. Of these 106 cases, *Endameba histolytica* was found in only eighteen and in two of these there was chronic ulcerative colitis. I believe that this incidence of eighteen cases of infestation with *Endameba histolytica* in 106 cases of diarrhea, or only 17 per cent of a selected group of cases, is deserving of careful consideration. Although it is of utmost importance to recognize the sixteen cases of infestation with *Endameba histolytica,* the explanation of the diarrhea in the remaining ninety cases must be searched for along other lines. In some of them the diarrhea proved to be due to chronic ulcerative colitis, in some, to achlorhydria, in others to irritable bowel in nervous persons, and in a few there seemed to be a definite relationship to dietary deficiency.

Endameba coli, Endolimax nana, Trichomonas hominis or *Chilomastix mesnili* should not be accepted as explanations of the dysfunction of the bowel. There occur cases in which repeated examinations of stools disclose many or all of these parasites, which may lead one to assume that such heavy infestation must be a factor in the symptoms. There is the occasional case, in which one or more of these parasites

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is the only abnormal element found by laboratory examination, and in which antiamebic treatment results in definite clinical improvement. I consider such a case as signifying either that *Endameba histolytica* was present and was not identified or that the emetin and organic arsenicals acted in a purely non-specific manner, such as is well known in the use of arsphenamine in the treatment of tuberculids.

In a small group of twenty cases in which *Endameba coli, Endolimax nana,* or both, were the only parasites found, antiamebic treatment was administered. Although it was not held that these amebæ explained the intestinal symptoms, yet treatment was instituted on the empiric basis that *Endamoeba histolytica* might be present but not identified. Of the twenty cases there seemed to be benefit derived from the antiamebic treatment in eight, whereas little, if any, response occurred in twelve. In the eight, it is uncertain just how definite a part was played by the specific treatment, as a suitable dietary regimen, dilute hydrochloric acid, and so forth, were employed. Opportunity was not afforded to make sufficient examinations of stools after treatment to determine whether the *Endameba coli* or *Endolimax nana* was eradicated; yet, even in the eight cases in which results were favorable, the response to treatment was in no wise as striking as it is in infection with *Endameba histolytica.*

The presence of these organisms in cases of normal or constipated action of the bowel can be even more fully disregarded. They were found in such cases merely as the result of the examination of a stool for occult blood as a routine, because of the history of passing segments of tapeworm, because of the patient's request, and so forth. *Endameba histolytica,* which is found in cases of normal or constipated action of the bowel, is of significance only from the standpoint of carriers, or the ever possible chance that dysentery might follow an acute illness or a surgical procedure.

I have avoided consideration of *Giardia lamblia,* as there seem to be reasonable clinical grounds for holding that this parasite, which infests the upper part of the small bowel, may be a factor in diarrhea. Experimentally or statistically there is little, if any, evidence for its pathogenicity. Furthermore, it is most rebellious to eradication and often it is hard to be sure whether it is or is not causing trouble. Fourteen cases of infestation with *Giardia lambia* were recognized during this period of six months; seven of the patients who were affected complained of spells of diarrhea and seven had normal or constipated action of the bowel. Treatment may be indicated in cases in which there are spells of diarrhea, but in the others the small risk of treatment is even greater than any good results that might be obtained.

The references that are made from time to time to the effect that *Endameba histolytica, Giardia lamblia,* and the other amebæ and flagellates mentioned here may be one of the etiologic factors in various forms of dermatosis, reflex abdominal complaints, arthritis, iritis, neurosis, and so forth, seem to me incorrect. Furthermore, valuable time may be wasted in employing treatment for infestation with these parasites. As a general working rule, even the one parasite which we all accept as pathogenic, *Endameba histolytica,* can be considered as an explanation of the patient's complaint only in the presence of diarrhea or formation of abscesses. I urge eradication of *Endameba histolytica* in any case in which it is found, but much explanation and trouble will be avoided by realizing that treatment seldom will be of subjective benefit if the patient's stools are normal or constipated. It is obvious that a neurotic person may be suffering from diarrhea, and although *Endameba histolytica* is found and treatment for it cures the diarrhea, one does not expect to cure the neurosis. But much less often will one influence, except unfavorably, a neurotic patient whose stools are normal or constipated by presenting to him, other than along very casual lines, the problem of eradication of amebæ. I emphasize this fact because the question of endamebiasis and neurosis has been the cause of more difficulty than even the question of the relationship of the ameba to arthritis; not that there is doubt concerning it, but the number of patients who consult the clinic with this problem seems to be increasing.

During 1928, thirty-five cases of *Endameba histolytica* were identified. The residence of these patients is always of some interest, and I found that the distribution was scattered throughout various states. Although this is of some interest, yet it is difficult, if not impossible, to give any idea of the incidence of endamebiasis among patients seen at the clinic. The residence

by states would have to be computed and even then many patients give an address at the time of examination which has not been their residence when the infection was contracted. Of course the incidence of acute amebic colitis in the north temperate zone is not as high as that seen in the tropics, and in previous reports[1, 2] the larger proportion of the milder cases of intermittent diarrhea seldom with gross rectal ulceration has been noted among patients from regions other than the tropics.

In this small group of thirty-five patients, three had chronic ulcerative colitis, and although antiamebic treatment was administered, specific treatment for the ulcerative colitis was more important. *Endameba histolytica* occurs in less than 10 per cent of the cases of ulcerative colitis and is a coincidental feature, which may or may not be instrumental in producing some of the symptoms. The recognition of this fact is necessary in order to obtain a favorable result in the treatment of such cases. Each disease must be recognized in order to effect a cure, as neither disease produces, or results in, the other.

Six of the remaining thirty-two patients had normal or constipated stools and were considered to be carriers. Ten patients were suffering with steady diarrhea and sixteen complained of spells of diarrhea with more or less constant "bowel consciousness." Proctoscopic examination revealed typical amebic colitis in ten cases. The value of taking smears for examination directly from the bowel must not be overlooked. In two of the ten cases, three examinations of stools had revealed only *Endameba coli* until smears from the rectal ulcers were examined and disclosed *Endameba histolytica.* The barium filling enema of the colon is of little value except to aid in ruling out any other pathologic processes. The only roentgenographic disclosures in uncomplicated amebic colitis are those of spasm, particularly of the ileocecal coil, and these are not of great significance.

In the group of thirty-five cases, there occurred four cases of amebic abscess of the liver. In one, aspiration was not done but the response to antiamebic treatment was so striking and the case seemed so clearly to follow the course of other cases of amebic abscesses that there was little doubt of the diagnosis. In the other cases, aspiration was done in two and drainage in the third. *Endameba histolytica* was identified in the pus in each case. In the preceding seven years, only six cases of amebic abscess of the liver had been seen and the fact that four were seen in one year is striking. The incidence of hepatic involvement in amebiasis is low in this region; probably in only a fraction of 1 per cent of all cases with amebæ does this complication develop.

For the last two years, the method of treatment employed at the clinic has evolved from an evaluation of the various compounds of ipecac or emetin and the organic arsenical preparations. Yatren (or anayodin) also has been employed in some instances, occasionally with excellent results, but more often the results have been discouraging. The high regard for the efficiency of ipecac and emetin continues and the response in a case of acute amebic colitis to the administration of 0.20 or 0.24 gm. (3 or 4 grains) of emetin hydrochloride is astonishing. Ipecac is unquestionably valuable but it also is hard on the patient and necessitates hospitalization. In the use of emetin hydrochloride these objections are avoided, but a serious objection to its use lies in the failure to effect eradication of the parasite in more than half of the cases. Use of arsphenamine was found to be successful in eradicating the amebæ, but the time and expense involved in a course of injections was an undesirable feature. The introduction of organic arsenical preparations that could be given orally has been an advance in the management of cases of infestation by amebæ. Stovarsol and acetarsone are essentially the same preparation. I have preferred to use a third preparation, treparsol. The therapeutic efficiency of the latter is not greater than stovarsol, but, as it is eliminated promptly, the risk of reactions is decreased. Treparsol alone is very efficient but the subjective response to treatment is enhanced by combining administration of emetin hydrochloride hypodermically, and treparsol orally. The patient receives 0.043 to 0.065 gm. (⅔ to 1 grain) of emetin hydrochloride twice daily for three days and this is repeated after a week's interval. At the same time, 0.25 gm. of treparsol is given with each meal for four days. The tablet should be chewed to facilitate more complete dispersion of the drug. The administration of treparsol is repeated for two or three more such courses, and eight to ten days are allowed to elapse between courses. This regimen has

seemed to effect cure in about 90 per cent of cases during the last two years. There is relatively little risk involved in using such a dosage of emetin hydrochloride, but there is an incidence of toxic erythema of 3 to 4 per cent from the arsenic. For this reason the patient should be seen daily during the first course, and at the least sign of reaction in the skin, administration of the drug should be stopped and it should not be used again. With such control, the danger of a more severe reaction, such as dermatitis exfoliativa, or even of death, is unlikely to occur. The possibility of peripheral neuritis being caused by either emetin or arsenic should be borne in mind, and if the patient already has had more or less recent treatment, yatren is a valuable second line of defense. The numerous other remedies, such as massive doses of bismuth, auremetin, bismuth-emetin-iodide, irrigations with kerosene, and so forth, must be resorted to occasionally, but persistence in carrying out a complete course of treatment as suggested obviates the need for the use of most other measures.

The intestinal worms which are more commonly met with in Minnesota and the neighboring states will be considered briefly: the cases of infestation with beef tapeworms (*Taenia saginata*) and fish tapeworms (*Diphyllobothrium latum*) vastly outnumber other varieties of infestation. The pork tapeworm has been referred to infrequently during recent years, and in the records of The Mayo Clinic there is not a single case of infestation with this parasite. As a result of a great deal of propaganda by parasitologists and public health officials concerning the proper cooking of pork, and the discovery of methods of killing trichinæ by freezing, the instances of parasitic diseases of man obtained from swine have been decreased.

The round worm (*Ascaris lumbricoides*) seems to thrive better in warmer climates and also bears a definite relationship to sanitation. In the Orient it is extremely common and various observers have noted that as high as 60 to 70 per cent of the population are infested. Ordinarily, the worm may cause few symptoms, although there seems to be present, in the infested patient, a certain degree of malnutrition and some nervous phenomena. These manifestations certainly could be explained partially on the basis of the patients' general habits of living. Reference also is made to toxic phenomena, such as headaches; they are attributed to the absorption of products derived from the worm, particularly from a dead worm which has not been passed out of the body. The wandering characteristics of the worm may produce serious mechanical obstruction by involvement of the common bile-duct, or of the larynx, producing fatal asphyxia. Another type of obstruction may result from a mass of dead worms that block the bowel. This has occurred when an anthelmintic has been used and has not been followed by a cathartic.

At present, there is not any entirely satisfactory method of eradicating round worms. For adults I prefer first to try 2 c.c. oil of Chenopodium in capsules given in 1 c.c. dose an hour apart; this may be given in the morning, with or without a light breakfast. Toxic symptoms such as nausea, vomiting, and signs of central nervous system irritation may result from absorption of the drug. This occurs much less frequently if the liver is well stored with glycogen. Also advanced cardio-renal disorders are contra-indications to the use of the drug. Two hours later, 30 c.c. of magnesium sulphate is administered. The stools are collected and carefully examined; usually only one or two worms are present. If this regimen fails, it may be repeated eight to ten days later, or thorough catharsis may be given in the evening, and the following morning 0.30 gm. (5 grains) of santonin followed by 0.065 to 0.12 gm. (1 to 2 grains) of calomel. The santonin is given on two successive days and repeated in a week if the stools still show the presence of worms or eggs. Occasionally a patient may suffer from yellow vision or vertigo and this should be explained to him, although it is not looked on as a serious complication when used in this dosage.

For years in The Mayo Clinic, from ten to fifteen patients infested with the beef tapeworm have been seen each year. It is surprising to learn of the number of persons who have a fondness for raw beef; not only the butcher who takes a bit from time to time, but also those who enjoy such delicacies as "cannibal sandwiches," which are simply raw ground beef with the addition of various condiments. As a result there continue to be cases of infestation with this worm. Magath and I were impressed by the almost total absence of any symptoms that could be attributed to the worm; it is only after the

patients become aware of its presence that almost any kind of symptom might be elicited.

Of even greater significance than the beef tapeworm is the fish tapeworm. At present there are not more than 200 cases of such infestation recorded from North America. It is well known that Dr. Nicherson of Ely, Minnesota, in 1906, reported the first case in this country in a native-born subject. The preliminary studies of Magath, in 1925, and his further report in 1927, emphasize the necessity of making every effort to prevent the spread of the infection. The identification of the larvæ of this worm in pike, pickerel, perch and trout shows how widely fish have been infected in certain lakes and the urgent need of instituting measures to prevent infection of fish in other lakes. Magath urges that sewage shall not be emptied into lakes or streams and that in an endemic center such as Ely an intensive campaign must be undertaken to teach people to cook fish well before eating it. Furthermore, any persons harboring the worm should be required to take treatment; the treatment should be verified by negative stools. The symptoms from the fish tapeworm are usually not more significant than those from the beef tapeworm. However, because of the severe anemia which sometimes accompanies the presence of the fish tapeworm, it is deserving of greater consideration.

Ehrstrom has made a fairly comprehensive study of this problem and he believes that anemia develops in only one of 5,000 to 10,000 cases. His studies were carried out in Finland; he estimated that there are from 500,000 to 750,000 carriers of this worm in Finland. In the small number of cases studied at The Mayo Clinic, none was associated with severe anemia.

The treatment, which has been previously described, is briefly as follows: The patient should not have luncheon or supper the day preceding treatment, although black coffee, tea or water may be taken freely. At 6:00 p. m. and again at 6:00 a. m., 15 to 30 gm. of magnesium sulphate is administered. Breakfast is not taken. At 7:00 a. m. and again at 8:00 a. m., 30 c.c. of emulsion of aspidium is administered. Two hours later, 30 gm. of magnesium sulphate is given and followed in another two hours by a large soapsuds enema. All stools, including the enema returns, are saved and carefully searched for the head. The enema is extremely important, for often when the worm is dislodged the head breaks off and passes into the colon, where it will remain unless swept out by a large enema. It is also important to use a saline purgative instead of castor oil, as aspidium is highly toxic and soluble in oil.

This procedure may seem unduly laborious but the method may be expected to yield successful results if each step is rigidly and precisely carried out. Many of the patients treated at The Mayo Clinic had been treated repeatedly, most of them four or five times, and one patient as many as eight times.

In trichinosis, treatment is of little value unless the disease is diagnosed at the onset of diarrhea, which is the time when the larvæ are maturing. During this period there is usually diarrhea and sometimes nausea and vomiting. A diagnosis may be made by the identification of the larvæ in the stools and any small epidemic of diarrhea occurring in a group of persons who have been eating the same food should lead to a careful search for the Trichina. Treatment at the onset is chiefly that of brisk purgation to sweep out the worms before the female has burrowed into the intestinal walls and deposited ova in the lymphatics. Thymol is recommended and should be administered. After invasion of the muscles, treatment is not of any definite value.

Treatment for pin worms is not complicated but must be carefully followed out. Since the greatest difficulty comes in preventing the subject from reinfecting himself, the most important step is to keep the hands from the anus. It is advisable for adults to wear canvas gloves at night and children should have their hands tied in the sleeves of their nightgowns. Underwear, night clothes and bed linen must be changed daily. The oral administration of 10 gm. daily of bismuth subcarbonate is advised by Leifer, and Chopra and Chandler suggest carbon tetrachloride in 3 c.c. dose, followed in two hours by 30 gm. of magnesium sulphate. This may be repeated in four to five days. A warm saline enema at bedtime, or 1 per cent thymol ointment applied locally, will help allay the irritation and permit sleep. Usually a week to ten days of this regimen will suffice to produce a cure.

SUMMARY

The significance of *Endameba coli, Endolimax nana, Trichomonas hominis,* and *Chilomastix*

mesnili is considered. The failure of these parasites to respond to antiamebic treatment is noted. A satisfactory method for the treatment of endamebiasis is reviewed. Attention is called to the occasional occurrence of amebic liver abscess in patients in the north temperate zone. Round worms are considered from both the symptomatic and therapeutic standpoints. The frequent occurrence and significance of the fish tapeworm is re-emphasized and treatment for it and the beef tapeworm is given. The recognition and prompt treatment of trichinosis are considered. Treatment for pin worms is outlined and the importance of preventing reinfection is emphasized.

BIBLIOGRAPHY

1. Brown, P. W.: Treatment of endamebiasis. Ann. Int. Med., 1928, ii, 177-191.
2. Brown, P. W.: A clinical consideration of endamebiasis. U. S. Vet. Bur. Med. Bull., 1928, iv, 752-755.
3. Chopra, R. N., and Chandler, A. C.: Anthelmintics and their uses in medical and veterinary practice. Baltimore, Williams and Wilkins, 1928, pp. 135, 144, 145.
4. Ehrostrom, R.: Die absolute und relative Haufigkeit der Betriocephalusanämie. Ztschr. f. klin. Med., 1928, cvii, 463-464.
5. Magath, T. B.: Experimental studies on *Diphyllobothrium latum*. Proc. Staff Meetings Mayo Clinic, 1927, ii, 169-171.
6. Magath, T. B., and Brown, P. W.: Standardized method of treating tapeworm infestations in man in order to recover the head. Jour. Am. Med. Assn., 1927, lxxxviii, 1548-1549.
7. Leifer (quoted by Abt, I. A.): Pediatrics, Philadelphia, Saunders, 1926, viii, 1063.
8. Mills, R. G.: Parasites, chiefly metazoan, observed in 7,000 specimens of feces from Koreans with an attempt to interpret the findings. Am. Jour. Hyg., 1927, vii, 222-263.

KERASOL AND KERAPHEN NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that in the advertising of the Picker X-ray Corporation, acting as distributor for the Kerasol Chemical Co., New York, the term "Kerasol" is applied to tetraiodophenolphthalein sodium and to capsules containing the drug. The Council further reports that under the name "Keraphen," with "Soluble Kerasol" as a synonym, the Picker X-Ray Corporation (as distributor for the Kerasol Chemical Co.) markets a mixture of tetraiodophenolphthalein sodium and tartaric acid. To avoid the confusion that is caused by the application of different names to the same substance, the Council does not recognize proprietary names unless they are applied by the discoverer of an article or by the one who discovers its therapeutic use, or with his consent. When the marketing of a product becomes open to general competition, the Council attempts to coin a convenient title for it, adopts this as the N. N. R. name, and then accepts the marketed brands only if they are offered under the N. N. R. name or the descriptive chemical name. In the case of tetraiodophenolphthalein sodium the Council adopted the contracted name tetiothalein sodium and adopted tests and standards for the control of products admitted to New and Non-official Remedies. Since the Picker X-Ray Corporation and the Kerasol Chemical Co. are not the discoverers of tetraiodophenolphthalein and since the marketing of this chemical in the form of capsules or in admixture with tartaric acid is not the discovery of these firms, nor of such fundamental importance as to justify the application of special names, the Council declared Kerasol and Keraphen inadmissible to New and Non-official Remedies. (Jour. A. M. A., June 29, 1929, p. 2171.)

DIPHYLLOBOTHRIUM LATUM (FISH TAPEWORM) INFESTATION IN CHILDREN

REPORT OF TWO CASES

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IN recent years it has been shown that fish in the lakes in certain regions in Minnesota have become infested with the larvæ of the broad fish tapeworm, *Diphyllobothrium latum.*[2]

Buffalo fish and carp from Minnesota lakes and rivers are for sale in the city markets. These fish are used by many individuals, most of whom are unacquainted with the possibility of parasitic infection. Among the Jewish people particularly, the way is open for widespread infestation with *Diphyllobothrium latum,* because of the method of preparation of a popular Jewish dish, Gefüllte Fish. Pilot[4] and Barron[1] state that it is a frequent practice among Jewish women to taste the minced raw fish used in the preparation of Gefullte Fish, to determine the proper seasoning. In the two cases comprising this report, both the children were Jews and both mothers remembered having given small bits of raw fish to the children to eat.

Barron[1] found only sixteen cases of fish tapeworm infestation reported, in which the patients were natives of North America. To this series he adds three, which with the cases here reported brings the total to twenty-one. Of this number thirteen cases, or 61.9 per cent, occurred in Jews. This percentage may be slightly higher, since in two of the series the nationality was unknown.

The following cases are reported for the purpose of calling attention to the possibility of *Diphyllobothrium latum* infestation among children; also to add to the literature two more cases of infestation in native-born Americans.

Case 1.—M. S., a Jewish boy, five years of age, was brought in for examination because of attacks of diarrhea and abdominal pain. Close questioning elicited the information that about two years previously the child had been accustomed to eat small pieces of raw fish. Pickerel, pike, buffalo, carp and other fish, native to Minnesota lakes, were used by this family and raw pieces had been given to the child by the mother. The history of diarrheal attacks and abdominal pain covered a period of about two years.

Findings on physical examination were normal. Urine and blood examinations were normal. The stool examination revealed enormous numbers of ovæ of *Diphyllobothrium latum.*

The boy was put in the hospital, where he received treatment with the Oleoresin of Aspidium. Four hours after the last dose of the drug, six feet of fish tapeworm were passed. The scolex or head was not secured. The following day, at home, another portion of worm was passed. This specimen was thrown away by the mother so it was not examined. The scolex was probably passed at that time, however, since the stool was examined one month later and found free of ovæ.

Three months after treatment, the mother reported there had been no recurrence of the attacks of diarrhea nor of abdominal pain.

Case 2.—M. M., a Jewish girl of seven, had been seen on several occasions over a period of about three years, because of abdominal pain. There had also been one attack of diarrhea during this time. On direct questioning, the mother stated that she used to give the child small pieces of raw fish to eat.

Except that the child was overweight, the physical findings were normal. Examination of the urine and blood gave normal findings. Examination of the stool showed ovæ of *Diphyllobothrium latum.*

Treatment similar to that used in Case 1 was followed by the passage of five feet of fish tapeworm. The scolex was attached to the worm passed.

This patient has not been seen since the treatment, so we do not know if attacks of abdominal pain have recurred.

DISCUSSION

Stool examinations in these cases were made according to the method described by Rivas and Fife.[2]

The treatment used was as follows: No food was permitted except crackers and milk, or toast and milk, for 24 to 36 hours before drug treatment was started. At 8 p. m., about 12 hours before the first dose of the vermifuge, 4 ounces of citrate of magnesia was given. At 8 a. m. the following day, 0.5 c.c. of Oleoresin of Aspidium was given in an enteric capsule. This amount was repeated at fifteen minute intervals

until four capsules were given. One hour after the last dose of the drug, 4 ounces of citrate of magnesia was again given. The mother was then directed to have the child pass the next stool into a pan containing warm water at about body heat to prevent the worm from breaking off as a result of muscular contraction incident to marked change in temperature on being passed from the bowel.

In addition to the above procedure, Magath and Brown[3] advocate giving a soapsuds enema in the evening if the scolex is not secured at the time the worm is passed.

Some difficulty may be encountered in treating children in getting the patient to swallow the large capsules necessary to hold the Aspidium. This difficulty can be avoided either by washing the capsules into the stomach by means of a stomach tube, or a liquid preparation of Aspidium recommended by Magath and Brown[3] may be used.

This preparation includes the following ingredients:

Oleoresin of Aspidium	6.0 Gr.
Powdered Acacia	8.0 Gr.
Water q. s. ad	60.0 Gr.

1 tsp. of the emulsion contains .5 c.c. of Aspidium.

BIBLIOGRAPHY

1. Barron, M.: Infestation with *Diphyllobothrium latum* (fish tapeworm) with special reference to native cases. Jour. Am. Med. Assn., Vol. 92, pp. 1587-93, May 14, 1929.
2. Essex, H. E.: Early development of *Diphyllobothrium latum* in northern Minnesota. Jour. Parasitology, Vol. 14, pp. 106-108, Dec., 1927.
3. Magath, T. B., and Brown, Phillip W.: Standardized method in treating tapeworm infestation in man to recover the head. Jour. A. M. A., Vol. 88, pp. 1548-49, May 14, 1927.
4. Pilot, Isadore: *Diphyllobothrium latum* (fish tapeworm) infestation. Report of a case of native infestation in a child. Med. Clinics No. Amer., Vol. 12, pp. 211-213, July, 1928.
5. Rivas, Darnasso de, and Fife, Chas.: Intestinal parasitism in Philadelphia. Jour. A. M. A., Vol. 92, pp. 624-627, Feb. 17, 1929.

ALLERGY IN RHEUMATIC FEVER

Recently J. C. Small isolated a non-hemolytic streptococcus from the blood and various other tissues and fluids of patients with rheumatic fever. He considers this a specific organism and named it *Streptococcus cardioarthritidis*. Vaccines and serums prepared with this organism have received a limited amount of study in the treatment of acute rheumatic fever. Against the specific nature of this organism there is, however, a not inconsiderable mass of evidence. In addition to the evidence that questions the specificity of the rheumatic fever of the organism claimed to be the cause of rheumatic fever, work has been done which points to an allergic factor as being the cause of the disease. The problem of etiology in rheumatic fever is complicated; a study of treatment yields largely futility and despair. (Jour. A. M. A., June 22, 1929, p. 2102.)

TRYPARSAMIDE IN NEUROSYPHILIS

Tryparsamide is indicated in certain types of neurosyphilis and has been used in systemic syphilis by some; but its efficacy is probably much less than that of the arsphenamines. Tryparsamide has a toxic effect on the optic nerve and therefore should not be used in cases in which primary optic atrophy or neuroretinitis is recognized, either on ophthalmoscopic examination or suggested by the complaint of diminution of vision. During the course of treatment in an individual who has no pathologic changes in the optic disks, a careful ophthalmoscopic examination should be done before each injection in order to find the earliest possible neuritic damage. There are a variety of methods of treatment applicable to both systemic syphilis and neurosyphilis far superior to tryparsamide for the ordinary case and much less dangerous. (Jour. A. M. A., April 20, 1929, p. 1373.)

FACTORS OF SAFETY IN GALLBLADDER SURGERY*

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I AM going to condense what I have to say out of deference to the other speakers on the afternoon's program, for I realize we are going to be short of time. But let me say before I come to the subject of my paper that St. Paul has many distinctions. Its very name suggests apostolic successions. Medically and surgically it will hold an enduring place in the hearts of the members of the State Medical Association. For it was in this great city that the first cholecystectomy in America was performed—on September 24, 1885—43 years ago—by a past president of this organization, Dr. Justus Ohage, still in active practice.

Will the members rise in tribute and cheer him for so great an achievement.

In connection with Dr. A. S. Hamilton's interesting report, I would urge the members to support the Historical Committee in their efforts to record the epic story of Minnesota medicine —for within this State there have been and are now some of the greatest men the world has produced in the field of medicine. Minnesota can well feel proud of so great a contribution.

Sailing along the New England coast one man's craft strikes a rock and goes to the bottom; but where his boat sank, there men lift a danger signal, and henceforth, avoiding that rock, many fleets with their precious cargoes are saved. So with the pioneer medical men. With rare courage, they matched wit against emergency and proceeded over uncharted seas. They performed the first cholecystectomies, the first prostatectomies, the first thyroidectomies, as there are pioneering spirits today developing a new age in surgery—the physiological—under the courageous leadership of such men as Leriche, Cotte and Adson—and brought out in Dr. Adson's thrilling and brilliant demonstration this forenoon in the cure of thrombo-angiitis obliterans and Raynaud's disease.

These pioneers, what heroism and acumen they displayed! What a heritage they have left! As they chart new sea-ways, they leave warning signs and erect lighthouses to guide those who are to sail the perilous seas after them.

Factors of safety in biliary surgery lie:

1. In urging the patient to early operation, before complications set in.
2. In an accurate and complete diagnosis.
3. In a careful appraisement of the physical status of each prospective operative patient.
4. In careful and aseptic surgical technic.
5. In exercising sound judgment as to what procedure is best to pursue in each individual case—keeping well in mind while operating the patient's history and complaint.
6. In instituting not routine but individual post-operative care.
7. In having in mind at all times the best interest of the patient.

Early diagnosis and early operation in cholecystic disease is one of the largest factors of safety in the whole problem. If the gallbladder is infected it becomes a menace of large import, for it likewise exposes the liver, the intrahepatic ducts, the heart and the kidneys to serious damage. Furthermore, the chronic gallbladder, if not recognized and operated upon early, favors the formation of stones, which in many instances migrate to the common duct, causing obstruction of the duct with disastrous consequences, as for example, jaundice, blood dyscrasias, cirrhosis of the liver, acute pancreatitis, carcinoma. Deaver has put the situation of procrastination thus: "Every time I operate for calculous obstruction of the common duct, I feel that somebody has not been on the job, having failed to recognize the futility of medical treatment and neglected to have the gallbladder removed before the stone or stones migrated into the common duct."

A lessened mortality and fewer complications in recent years have resulted more from an appreciation of the necessity of a better preparation of the patient for operation than from an increase in technical skill, more through sound judgment than through speed, more through an accurate diagnosis than through a greater manual dexterity.

Why can Crile and Charles Mayo, in their

*Presented before the Minnesota State Medical Meeting, St. Paul, Minnesota, May 15, 1929.

toxic thyroid surgery, show a 1 per cent mortality today as against 10 per cent fifteen years ago? Their surgical skill is surely not responsible for the difference, for I am sure both had reached the summit long before then. Is not the reduction due rather to the pre-operative preparation as recommended by Plummer and the careful appraisement of each patient?

Why can the modern urological surgeon do a series of 500 prostatectomies in people in the sixty's and seventy's with only a 2 to 3 per cent mortality, as against the record of the equally or even more deft surgeon of ten years ago with an operative mortality of 10 to 15 per cent? Because, before the patient comes to the final operation in our day, he is decompressed, transfused, detoxicated, his blood urea reduced, his strength buttressed to the full against the ordeal by every means that medical science has at its command.

In the same careful and scientific manner is the patient prepared for surgery of the colon in obstructions due to malignancy or other causes, which is a prime factor in the reduction of operative mortality.

Modern medical training, apprenticeship, experience have taught the young surgeon of today wherein safety lies. He no more thinks of placing a patient on the operating table to undergo major surgery without a careful examination to ascertain his physical status, than he would allow himself to start out on an automobile trip with his family in the car without first checking up his steering wheel, tires, brakes and the amount of gasoline in his tank.

He makes more accurate diagnosis, that he may not only know the main ailment of his patient, but also the associated conditions that may, under the stress of his operation, come to the fore and defeat his purpose. This investigation will help him to balance the surgical insult imposed. He may be aided in the determination of his patient's condition, aside from what a careful history gives him, and the clinical findings, by the modern armamentaria which science and invention have placed at his command, if such are needed in the evaluation of his case. Electro-cardiograms, the roentgen ray, dyes, the cystoscope, the bronchoscope, the proctoscope, the Wassermann test, may all be used in the appraisement.

Trained as he is, he is less likely to mistake a cholecystitis for a root pain, a coronary for an upper abdomen. Nor is he apt to mistake a hydronephrosis or a stone in the pelvis of the kidney for a gallbladder condition, for his careful history-taking and a pyelogram, together with a Cole-Graham, will help him to differentiate—or discover both, if they be co-existent. He will not mistake an abdominal migraine for gallstones. He will not take a diabetic, arteriosclerotic hypertension patient and operate on him for cholecystic disease, without a careful pre-operative regime. He will not hurry an obese woman with co-existent myocardial degeneration to operation without a long pre-operative treatment by means of diet and rest.

Except in emergencies, he will not operate on a patient with even a suspected "cold." If he finds a post-operative oncoming pneumonia, he will add to his ordinary treatment the oxygen tent or introduce oxygen subcutaneously and see the distressed respiration and cyanosis disappear under it.

He will not operate on a deeply jaundiced patient without the three-day intravenous calcium chloride treatment—a la Walters.

He will never take a low-pressured, anemic, toxic, infected, dehydrated patient to the operating table until he has detoxicated, transfused and suffused the tissues with salines, glucose and sodium bicarbonate, as indicated.

He will select the type of anesthesia according to the patient's condition—regional, splanchnic, spinal, ether or gas.

He will heed Crile's warning as given in his chapter on "Operations on the bad-risk patient," when he says: "It would appear therefore that every patient should be subjected to the most searching scrutiny on the part of the surgeon to discover whether or not special supporting measures are required, and in case of even the slightest doubt those measures should be applied not after but in advance of the emergency."

He knows the factors of safety, too, in careful technic. He fortifies himself by an adequate incision—the lack of which has embarrassed one in many a situation, for it has proved the first cause of running into serious difficulties. He works cautiously near the cystic duct—for it is there where three-fourths of his troubles come, either through haste, lack of composure, poor orientation, or bungling. Here is where hemorrhage from the cystic artery may cause him, in

his excitement, to do irreparable damage to the common or hepatic duct—resulting not only in secondary operations with poor results, but even death.

He drains in every gallbladder case. He does a cholecystostomy rather than an -ectomy in the deeply jaundiced patient and in the acutely inflamed, edematous empyemic gallbladder. He does not delay operation in evident cases of threatened perforation, empyema, or gangrene.

The surgeon is a part of a great profession. He should never lend his art to ignoble purposes. He has great responsibilities, and should make it his duty to keep abreast of the times. His idealism should help him to realize, with Dr. Wilkie, that "grievous and irreparable harm may be done by his acts and his art thereby brought into disrepute. He should realize that it is not only the patient who is sacrificed; but that our cause is wounded in the house of our friends."

IRRADIATED ERGOSTEROL

Lest there still remain any misunderstanding, it should be recalled that the therapeutic virtues of cod liver oil are by no means to be identified with irradiated ergosterol; for the liver oil is rich in Vitamin A, which is in no way identical with the antirachitic properties of the irradiated ergosterol. The publicly announced statements that solutions of irradiated ergosterol represent the long desired "synthetic cod liver oil" are utterly misleading except as the Vitamin D component is concerned. Irradiated ergosterol cannot replace butter—a common source of Vitamin A—though it may supplement the valuable milk fat. When a highly potent substance such as irradiated ergosterol becomes readily available, it behooves us to consider carefully whether a danger of overdosage exists. While there appears to be a liberal range between a physiologically beneficent intake and a possibly injurious overdosage, there can no longer be much doubt that massive doses of irradiated ergosterol may result in considerable impairment of nutrition, loss of weight, pronounced hypercalcemia, and abnormal calcium deposits in certain tissues and organs. Investigators in the U. S. Public Health Service state that irradiated ergosterol is no doubt a useful drug and one endowed with great potency, but not without possible harm in the hands of the unsuspecting. Probably this is true also, the investigators add, of the haphazard consumption of food-stuffs that have been subjected to the action of ultraviolet rays. (Jour. A. M. A., June 15, 1929, p. 2023.)

CORAMINE-CIBA

The Council on Pharmacy and Chemistry publishes a preliminary report on Coramine-Ciba. The product is stated to be pyridine-carbonic acid diethylamide, proposed for use as a circulatory stimulus in cardiac failure, surgical shock, narcotic poisoning and respiratory failure. The product is marketed as Coramine Liquid, a 25 per cent solution for oral, sub-cutaneous, intramuscular and intravenous administration. The A. M. A. Chemical Laboratory confirmed in a general way the chemical claims. Eleven reprints were submitted by the Ciba Co., Inc., in support of the claims made; four of these referred to animal experiments, six to clinical results and one to both. In addition, the Council's referee examined a number of reports not submitted by the firm and reported the tenor of all to be favorable. The experiments on animals are not impressive, in view of the very large doses used to produce effects in animals. It is probable, however, that with a drug of this character observations on man would be most convincing, if they could be thoroughly controlled so as to exclude spontaneous changes. It is doubtful whether this is the case in the present instance, and while the clinical reports are generally favorable, they are not decisive. The Council voted to postpone action on Coramine-Ciba to await further experimental and clinical evidence which may establish its usefulness and to publish its report bringing out the experimental status of the product. (Jour. A. M. A., June 1, 1929, p. 1837.)

THE ACUTE PERFORATION OF THE DUODENAL ULCER*

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PERFORATION of a duodenal ulcer is a great catastrophe and is one of the most dramatic of the acute abdominal crises. I believe that this problem, of all those confronting the surgical staff in a large hospital today, is one of the most vital. Cases come in with considerable regularity. Contributions on this subject are frequent. Practically not a single month passes but one or two articles on this topic are published in the best journals. In the great mass of literature that has been published in the past, I have been able to find only one article[1] offering any laboratory research.

In this, the first section of my study, the objectives are to gather and to evaluate and correlate much of the recent data; also to review a series of some forty-six cases occurring at the Minneapolis General Hospital during the period of five years, from 1923 to 1928; and to determine what investigation either of a clinical or of a laboratory nature might be done to improve the mortality rate and the late results, none of which are very flattering. Not many can be very proud of their record in this field, as will be seen in the mortality chart.

It has been hoped that in working over this material some light might be thrown on the pathogenesis and the pathological physiology of peptic ulcer in general. More knowledge is needed in both these fields before the prevention and therapy of perforation can be improved.

My interest in this subject started in 1910, when I assisted Dr. Emil Beckman on the first case I had ever seen. Many will remember that in 1913, at the meeting of the American Medical Association in Minneapolis, Deaver read a paper on this topic which provoked a very lively discussion by Ochsner, Coffee, Mayo, Babcock, McKenzie and others. At many meetings since and especially at the American Medical Association meeting last summer, when Gibson read his paper, the battle still raged. It is evident that during the last twenty years, with all this agitation, there has not been the advance in this particular type of surgery that we have hoped for and have had every reason to expect.

In treating the subject I shall follow the conventional order of procedure, but will bring out only those things that seem of special interest under each heading.

HISTORY

To Mikulicz has been given the credit for the first suture of a perforated ulcer, in 1889. His patient did not live. Kriege was the first to suture an ulcer with recovery, in 1892.

ETIOLOGY

The real key to our success with peptic ulcer, and duodenal ulcer in particular—and hence perforation—lies in the discovery of the cause or causes. That this is a fertile field for study is only too well known.

Duodenal ulcer itself seems to be on the increase; naturally this means more perforations. In one clinic 2,261 duodenal ulcers were diagnosed by *x*-ray during 1928 and of these 803 came to operation. In this number there were thirteen acute perforations. Formerly 10 per cent, and now 12 per cent according to many authors (with Deaver putting it at 15 to 20 per cent), of duodenal ulcers perforate. Deaver goes on to say: "Hemorrhage and perforation are the chief and also the most frequent complications of the duodenal ulcer. Their frequency indicates the importance of the strict supervision of all ulcer patients. We believe that if patients were aware of the frequency of the inherent dangers, they would readily accept the conservative method of surgical intervention."

Duodenal ulcer is largely a disease of men, the ratio being 4 or 5 to 1—hence perforation is chiefly concerned with the male. In this series of forty-six cases all were men. Most of them were of middle age or beyond. W. J. Mayo, in attempting to explain the relative frequency of duodenal ulcer in the male, says: "In men the first portion of the duodenum passes upward. In women it is much more often transverse and

*From the Department of Surgery, University of Minnesota, Minneapolis General Hospital. Read before Minneapolis Surgical Society, March 7, 1929.

consequently in them it is alkalized by the bile and pancreatic juice."

The predisposing factors in perforation are not known. Many things seem to have a bearing, such as overloading the stomach, severe exertion, blows on the abdomen, barium meals with manipulations, passage of stomach tubes, acute alcoholism, eating the fruit of the papaya tree, etc. Many, however, perforate on an empty stomach, or even while the patient is asleep, or in bed on a Sippy regime.

One element I am convinced has a very definite relationship and that is an acute upper respiratory tract infection, an acute outbreak of oral sepsis, a mild bacteremia, or a toxemia of any sort. This relationship is evidenced by the fact that in our series several had had recent acute infections, some with a concomitant acute bronchitis or broncho-pneumonia. Again, we see the coexistence of fulminating infections of the appendix and an aggravation or actual perforation of a duodenal ulcer, following in the wake of an upper respiratory or other infection. In the future I would suggest that an attempt be made to obtain a blood culture on entrance of selected cases of ruptured ulcer.

Dental, tonsillar, and sinus infections, usually of a marked degree, were found in practically 100 per cent of the cases in this series. The percentage of concomitant infection in the appendix, gallbladder, and other abdominal areas was not so high. I believe that the records in this regard are incomplete or that some associated pathological process may have been overlooked in the need of prompt operation.

PATHOLOGY

It is now generally accepted that the majority of acute perforations occur in chronic ulcers. Moynihan presents a series of 218 ruptures where only six had no previous history of indigestion. In 117 deaths from perforated ulcer with autopsies in England, there were only twelve acute ulcers and in these twelve there were four that also had chronic ulcers and the latter was the one perforated in each instance. The results obtained in the various and ofttimes laborious researches on the pathogenesis of these chronic ulcers frequently seem discouraging. A good deal has been discovered, however, most of which is familiar to you. It is apparent that lesions similar to human duodenal ulcers can be produced by any one agent or a combination of a number of agents, such as vascular injury, bacterial injections, chemical or biologic toxins, trophic or glandular changes, heat or cold, and variations in the chemistry of the digestive juices.

Three comments concerning the cause of ulcer in general are of sufficient interest and ingenuity to be repeated here. Moynihan states: "Acute ulcer is a term used to describe a condition in which chaps, fissures, erosions, extensive surface destruction of the mucosa or even deeper layers are found. There is often clear evidence of an impediment to the vascular supply resulting in a defenceless area, of which the gastric juice makes haste to take advantage. The ulcers thus arising develop rapidly, often as terminal events, in consequence of a heavy infection or grave toxemia, and they probably heal rapidly. Acute ulcers are multiple. It is possible that a chronic ulcer begins in one of the acute ulcers that refuses to heal."

Brenner[3] in trying to elucidate the greater frequency of ulcer in the prepyloric region and the duodenum says: "The pendant portion of the stomach, which includes the distal part of the lesser curve, the pylorus and the first portion of the duodenum, has a blood supply that is considerably less than the stomach proper. This subvascularization is enchained by traction, when the stomach assumes a more vertical plane for a few hours after a meal. Moreover in this area the mucosa is intimately attached to the muscle layers with formation of rugæ. Thus no allowance is made for dilatation and traction and the area is predisposed to traction anemia. This ischemia lasts for two hours after meals and may be a potent predisposing factor for selective embolic infections, thromboses, or tissue digestion."

Einhorn is opposed to the belt in the prophylaxis and treatment of ulcer, apparently reasoning from the analogy of the frequency of ulcer in occupations where abdominal pressure is evident—cobblers, horse-shoers, etc.

Thus, in the description of the essential lesion of acute perforation, it is plain that there is a division into two great classes: (1) The acute perforation in the acute embolic ulcer; (2) the acute perforation in the chronic or already established ulcer. We are not concerned now with the perforations in the latter type.

The acute ulcer is usually a clear-cut "blow-

out" 2 to 3 mm. across, with minimum induration and reaction around about. The chronic ulcer presents four main types:[3]

1. The large ulcer with much scar tissue formation, encroaching upon the lumen of the duodenum and accompanied with more or less extensive extrinsic adhesions.

2. The medium-sized ulcer with moderate tissue infiltration, without narrowing of the lumen.

3. The small ulcer with a non-indurated or only slightly indurated base.

4. Multiple ulcers, including the so-called "kissing" type.

I believe it is important to remember that a non-calloused ulcer can be many years old. Most perforations occur in the last three groups. They are simple, single, round, slightly indurated 1 to 2 cm. in diameter, on the supra-papillary part of the duodenum (the proportion is 450 to 1) and nearly always in the first one and one-half inches of the anterior or superior surface.

The associated pathology consists of all grades of chemical and bacterial peritonitis, either local or general. Lesions of the appendix and gall-bladder are also frequently present. Broncho- and lobar pneumonia are found and at several European clinics emphysema of the skin, either local or general, is described in several instances.

The more commonly associated later complications consist in residual abscesses of all sorts and in all locations—especially subphrenic, hepatic, and pulmonary—also empyema and duodenal fistulæ.

SYMPTOMS

The symptoms of this condition are too familiar to require discussion in any great detail.

However, we should recognize that this is a complication of the chronic ulcer and hence often preventable. Management of the chronic peptic ulcer must be more strict, rather than "ambulatory" or dilatory as is frequently the case today, if our statistics are to improve. Surgery must be recommended more forcibly, at least in the cases that have had their nine medical cures. Greater publicity among the laity is necessary.

I believe we can now point out to you one other avenue of prevention. Certain ulcers, estimated at less than one-fourth, have prodromal signs and symptoms of perforation. There may have been very distinct exacerbations in severity of symptoms for days or weeks before—a warning that usually goes unheeded. Evidence of bleeding may precede perforation. Failure of the usual food relief sequence and the occurrence of night pain in patients formerly free from it, together with tenderness and rigidity in the epigastrium, are often premonitory signs. Excessive spasm, as noted in the *x*-ray, should put the observer on guard.

As regards the symptoms of a typical attack I will repeat an apt expression:[4] "The leading symptom is pain, the leading sign is rigidity, and the leading clue is a previous history of indigestion."

A word in regard to this question of previous history of dyspepsia. These people are often in such agony that no previous events can be made to seem important to them. You may have to reserve this part of the story until after the operation. Again, it is said: "These patients have often had indigestion so long they have ceased to remark upon it: it has been a part of their daily condition to which they submit uncomplainingly."

The terrific, agonizing pain of sudden onset, the unyielding rigidity often in a scaphoid abdomen, together with the wild-eyed anxious expression, costal breathing, cold sweat and "set" immovable posture, are too well known for further comment.

True surgical shock does not occur at the onset, as the pulse is not accelerated and the blood pressure is normal. This term is used too loosely and should be discarded. Collapse or prostration would be a better expression.

Briefly concerning this collapse, it may be said that with many patients it is the predominating sign from the onset to the time of their death in one to three days. They never apparently rally. It is a sort of "solar plexus" blow. Peritonitis, as we think of it, has not had time to develop. Several writers now are offering the suggestion that one great contributing factor is the absorption from the peritoneum which has been inundated with chemically active digestive juices. "There is a suggestion in some experiments now being conducted by Wangensteen[5] and some of his associates in the experimental laboratory of surgery at the University of Minnesota, that collapse that attends perforation of an ulcer into the free peritoneal space may have its ex-

planation in a peritoneal reflex. Symptoms dependent on a reflex mechanism for their causation are always subject to a wide range of variability, and the great variation in the degree of prostration exhibited by patients following perforation may find elucidation in such an explanation."

The rather fleeting supra-clavicular pain was only noted twice in this series. It is significant when present and is undoubtedly a phreno-spinal accessory reflex.

The obliteration of the liver dullness is more misleading than of value. It is difficult to elicit at best. Gibson says:[6] "In my experience it is of the greatest rarity." Spontaneous pneumoperitoneum can be demonstrated by the fluoroscopic screen or film with the patient lying on his side on the stretcher. Forcing this type of examination is hardly justified in the average case.

Nausea and vomiting are not always such a prominent feature as one would expect. Especially is this true when compared to acute pancreatitis and appendicitis. However, in some series it is common, being 40 per cent in the duodenal cases reported by McCreery[7] from the New York Hospital.

The findings gradually change as the peritonitis develops. A period of so-called "fatal improvement" may be observed but soon the typical picture of a distended "silent" abdomen with diffuse peritonitis is evident.

DIAGNOSIS

In the diagnosis of this condition it is often not a matter of trying to be so exact in the differentiation nor is it one of "watchful expectancy." It is sufficient to determine that a surgical emergency exists and to proceed to prepare for its treatment. Speed in bringing surgery to these people is the one great essential. As W. J. Mayo says: "It is better to be operated within twelve hours by a surgeon of little experience than by the most skillful surgeon in twenty-four hours." Cases where an acute perforation has not been found usually have some other condition requiring surgical treatment.

Briefly the direct diagnosis will depend upon the history of previous dyspepsia, a sudden severe epigastric pain followed in rapid succession by any or all the subjective and objective findings mentioned above.

The whole picture of this disease is so characteristic in the typical cases, that once a perforation is seen it will never be forgotten. Most ruptures are easily recognized in the receiving room. A borderline case may be confusing but they are unusual. Formerly mistaken diagnoses were reported but they are less and less frequent today. When Moynihan's list included forty-nine cases, the first incision had been made over the appendix in eighteen instances. E. H. Pool[8] in 1922 chronicled fifty-nine cases with an incorrect diagnosis in seven—six appendicitis and one cholecystitis. In only one instance in our series was any grave error made. In that case the appendix was removed and nothing more done.

In the differential diagnosis, the following would appear as of greatest value to be carried in mind: Appendicitis, perforated gastric ulcer, disease of the gallbladder or ducts, acute pancreatitis, acute intestinal obstruction, diaphragmatic pleurisy or pneumonia, vascular accidents such as coronary thrombosis or thrombosis in the mesenteric vessels, and ruptured ectopic pregnancy.

I have prepared a more detailed outline for differential diagnoses with regard to certain of these conditions, which is of value for review.

Acute Appendicitis.—The two diseases may coexist.

Similarity—

Pain: often sudden and in epigastrium or umbilical region and later on right side.

Tenderness: In right and often left fossa.

Dissimilarity—

History: may be the same. Not usually the duodenal ulcer type of early history.

Rigidity: not so intense and unyielding.

Agony: not so intolerable.

Respiration: not so strictly thoracic, as diaphragm is not so tightly held.

The relative tenderness and rigidity are different.

Acute Pancreatitis.—

Similarity—

The intensity of the agony at least equals and often exceeds.

Collapse is greater and more fulminating.

Dissimilarity—

History: often early history of gallbladder disease; often stones.

Pain in pancreatitis always worse in the epigastrium and it is there that tenderness, resistance, and distension are found.

Enlarged and edematous pancreas may be found.

Pulse: bad from the start. Often thin, poor quality, and rate may be disproportionate.

Vomiting: usually more prominent.

A peculiar cyanosis or lividity, particularly of the face, is frequent.

Pancreatitis occurs more often in corpulent people—often in women during early months of pregnancy.

General distension is rare.

The right side of the abdomen is not especially involved.

The hurried, jerky respiration due to fixation of the diaphragm is not seen.

Gallbladder and Ducts.—

Acute perforation may exactly simulate.

Careful previous history is the only possible aid in differentiation.

Acute Thoracic Disease.—

Similarity—

Possibly this simulates acute appendicitis more, but it can imitate perforated ulcer very closely. The fact that the explanation for the symptoms and signs lies above the diaphragm is something that the surgeon must never forget.

These points may aid in differentiation:

1. In chest conditions the initial temperature is often higher; in perforation it seldom is more than 102° in contrast to 103° to 105°.
2. Rapidity of respiration (forty or more) in chest conditions.
3. Disproportion between pulse and respiration.
   Chest—Pulse 100, and respiration 34 to 45.
   Abdomen—Pulse 120, and respiration 25.
4. In abdominal conditions there is never the same unchanging resistance of the abdominal wall and tenderness is more of the exquisite superficial type. The area affected is less and degree of involvement is less.
5. There is a comparative tranquillity of the lower chest where the chest organs are involved.

TREATMENT

It is in the treatment that the greatest divergence of opinion is found. Perhaps this is not possible to standardize owing to the nature of the disease. Various opinions and arguments will be presented in as impartial a manner as possible.

Certain ideas may be said to be fixed, and one of these is that there is a prophylactic side to the treatment of perforations. Relative to this point allow me to quote Moynihan at some length:[4]

"The duty thus laid on our profession is clear. We must take pains to become familiar with the signs and symptoms of chronic ulcer of the stomach and duodenum, so that this fatal catastrophe may be prevented. Perforation is a sign of neglect of some one—either the patient or doctor. It is not important that we should have equal knowledge of all diseases: it is important that all who are in general practice should have the clearest knowledge of the diseases which immediately and irrevocably assail life.

"Failure to recognize the emergencies that we are now considering means the loss of a man's life. Not less than 90 per cent of the perforations concern chronic ulcers.

"The position is serious, as a review of hospital reports from all parts of the country will show. It is our bounden duty to do what we can to improve it."

In the treatment of the acute rupture all agree that immediate surgery is the great deciding factor. Once the emergency has been determined a suitable opiate is administered, stomachal aspiration is performed if necessary, and a small amount of methylene blue may be given. Your patients may or may not be dehydrated, and it is also reasonable to presume that many of them have the disturbed ration of blood chlorids, urea and carbon dioxide combining power, practically always seen in pyloric and high duodenal obstruction, either of a transitory or chronic nature.

In the operative technic a combined local and ethylene anesthesia will be suitable for the majority. The individual surgeon's judgment must govern whether he will do a simple closure, cauterize the edges of the rent, excise, or do a pyloroplasty according to the Horsley, Finney, Mayo or Judd technic. Again, his judgment will enter into whether the closure will consist of one through-and-through stitch reinforced by a purse string, or interrupted stitches put in the way the tissues fold in the easiest, or on the Heineke-Mikulicz principle. Reinforcement of the closure with free or attached tags from the gastrohepatic or gastro-colic omentum, or a piece from the suspensory ligament, must be considered. Any man's judgment in the above matters will be influenced by many factors, principally the time elapsed since perforation, the type, the size, and the position of the ulcer, also the interval since a meal, his opinion of the infectivity of the duodenal contents, the general condition of his patient, and the operating facilities available, together with the skill of his operating team.

Furthermore his judgment will be influenced by his own experience, his training, his keenness of observation and the data he may have at hand. Again, his decisions and actions may be determined by his knowledge of the experience of others. Therefore as regards the battle ground for and against a primary or secondary gastroenterostomy I would like to go into more detail.

Braun in 1897 did the first primary gastroenterostomy in a perforated ulcer. Moynihan claims the priority, having done his first in 1901.

He has continued to advise this operation since, while in this country Deaver has been its strongest advocate. The New York group led by Gibson oppose gastro-enterostomy; some say "never," and some "well, at times."

With your indulgence I will quote from several authors and then sum up some of the reasons given for and against.

Brenner[3] in twenty-seven cases had 60 per cent that required a second operation. He says: "Within the first twelve hours a simple closure will result in a cure in the vast majority of cases. The cardinal indication for gastro-enterostomy would be actual or organic obstruction." He reserves primary gastro-enterostomy for large calloused ulcers where closure produces a real stenosis and where there is already altered gastric physiology or function. A good practical rule he says is: "When in doubt—don't. It can be done later."

Gibson has a dozen articles on perforation in the more recent literature. In one essay he states that nineteen patients or 15.4 per cent of that series required a second operation and two had a second operation for perforation. It may be argued, he says, that if they had been more liberal with a prophylactic gastro-enterostomy they would have had fewer reoperations. His rejoinder to that is, that they might have had fewer living patients to operate upon. In another paper he admits he does not attempt to settle the vexatious question for or against gastro-enterostomy.

E. H. Pool[8] believes that 33 per cent will require a second operation.

Smith[9] in forty-one cases with simple closure enumerates four that had a second operation.

Cutter in reviewing several recent series concludes in favor of gastro-enterostomy.

D. Guthrie in his questionnaire had replies from 150 surgeons:

Twenty-four did gastro-enterostomy routinely (or pyloroplasty).

Sixty-four never.

Sixty-three varied procedure with circumstances.

Lewisohn[10] of Mt. Sinai has probably followed up his cases longer and with greater scrutiny than many. His study includes careful histories, physical examinations and *x*-ray series, in thirty-three cases operated between 1915 and 1925, and reported in the Annals of Surgery for May, 1928. He concludes: "First, a closure of an acute perforation of a gastro-duodenal ulcer (with or without gastro-enterostomy) failed to cure the patient in 39 per cent of the cases. Second, in those patients which were subjected to a partial or subtotal gastrectomy we often found another ulcer had been overlooked at the time of the primary operation. We have learned from our experience with resection that multiple ulcers occur in about 50 per cent of the cases." He goes on to state that possibly Finsterer, Von Haberer, Kreuter, Schwarz, Bruett, Paul and others may be on the right track when they urge and practice partial gastrectomy in the perforated duodenal ulcer.

Collinson,[11] Moynihan's right hand man, collected the results in fifty-three cases of his own and in those of others.

In twenty-six patients without gastro-enterostomy, seventeen, or 65 per cent, are free from symptoms. Nine, or 35 per cent, have recurrence of symptoms.

In twenty-seven patients with gastro-enterostomy, nineteen, or 70 per cent, are free from symptoms. Seven, or 26 per cent, have had recurrence.

One died of another cause.

Collinson modifies the use of gastro-enterostomy according to whether or not the surgeon is adept in performing the operation. However, to both those who are experienced and those who are not, he says, "When in doubt—don't."

To make this study complete on this seemingly moot point, I have prepared a list of arguments for and against gastro-enterostomy as they occur in the literature.

FOR GASTRO-ENTEROSTOMY

1. Perforation, with closure alone, does not cure the ulcer in a large number of cases.
2. Gastro-enterostomy does not affect the mortality in properly chosen cases.
3. The danger of spreading infection by gastro-enterostomy is of theoretical rather than practical importance.
4. While gastro-enterostomy is not always successful in relieving symptoms or preventing complications, there can no longer be any doubt about its specific effect.
5. Suturing always narrows the lumen and gastro-enterostomy safegards against second-

ary perforations and the effect of subsequent stenosis.

6. While subsequent jejunal ulcer is a possibility to be recognized, its incidence is extremely low.

7. Gastro-enterostomy relieves tension on the suture, purse string or whatever is used to close the ulcer.

8. The operation changes the chemistry of the stomach secretion.

9. Coexisting ulcers, if present, are favorably influenced.

10. The risk of hemorrhage from the bed of the perforated ulcer is minimized.

11. The administration of food and fluid can be begun earlier and with greater confidence.

12. All these factors make for a reduced primary mortality.

13. Stenbuck[15] reports eighty-eight cases from Mt. Sinai in all stages where a gastro-enterostomy was done in addition to closure. Four cases died or 14 per cent as compared to 31 per cent for the whole eighty-eight cases. Many so treated were advanced cases with peritonitis.

14. Moynihan states in the Practitioner for May, 1928: "But the wisest opinions seem to have drifted towards a recongnition of the need of some procedure to counteract and control stenosis in a large proportion of cases of duodenal rupture."

AGAINST GASTRO-ENTEROSTOMY

1. It is unnecessary—perforation curing the ulcer.

2. It adds to the mortality.

3. There is danger of spreading infection in peritoneal and retroperitoneal cavity.

4. It is not necessary in 100 per cent of the cases.

5. Reperforation, hemorrhage and stenosis are exceptional sequelæ.

6. There is danger of subsequent gastro-jejunal ulcer.

7. Deaver, himself, has had one case of gastro-enterostomy where a large hematoma formed in the transverse mesocolon, which required drainage.

8. A. J. Ochsner[12] spoke against a gastro-enterostomy by an unskilled operator—stating that he thought lavage (and now duodenal tube) would give the same amount of rest and quiet.

9. Brenner favors simple closure in the "soft" ulcer type (61.5 per cent in his series of fifteen cases). In the calloused type (39.5 per cent of his cases), he used gastro-enterostomy.

10. John Garlock[13] in reporting 100 cases from the New York Hospital states that 99 cases had simple closure at the primary operation. Ten also had gastro-enterostomy at the time of the first operation. In all, ten cases, including one pyloroplasty, required a gastro-enterostomy later.

11. A. O. Wilensky[14] says that in the group of cases where there is perforation in the base of an established ulcer, it is better to do a simple closure of the perforation during the emergency. One can always reopen the abdomen, should there be sufficient indication to do so, and then carry out the procedures which seem best at a time when conditions are not complicated by the dangers of an acute perforated lesion.

12. E. H. Pool[8] in reporting 59 cases says: "Our figures indicate that two out of three cases do well after closure alone: that only one in three after closure develop pyloric obstruction that demands operation."

In my own opinion I believe that the surgeon should keep an open mind, individualizing when the abdomen is open. To state dogmatically that all cases treated by simple closure will result in cure is as illogical as to insist on a primary gastro-enterostomy as a universal procedure.

In a calloused lesion—"the old battle scarred type," as I like to call them—with a large flabby obstructed stomach, you just know that a gastro-enterostomy is going to do the greatest amount of good. In an innocent looking rent, operated early, and every advantage being on your side, you can proceed as you might in operating a case at the time of election. Given a patient with more fulminating symptoms, you are not going to be so free to choose. Of this I feel positive: a primary gastro-enterostomy gives an ease, a smoothness, and a freedom from irritating disturbances, during the immediate post-operative convalescence, that can be a great comfort to your patient, his relatives and friends, and—last but not least—to yourself. These are the anxious days, when the big fight is going on, especially in those men with great prostration or collapse, spoken of earlier in the paper. Also during that interval you can count on the gastro-

enterostomy helping to make your plication hold and preventing further leaking. Again, to these people you can give fluids and other foods earlier and with greater confidence. The relief, following your program of enteroclysis, hypodermoclysis and intravenous therapy, is frequently gratifying.

The question of drainage comes up now in its logical sequence. Here, also, the surgeon's judgment will determine his conduct. To take something from Collinson, I would say, "When in doubt—do." Penrose drains do not produce the difficulties we used to see with the stiff tubes. A Penrose is of much value, however, in the cul-de-sac. Dr. Abbot used to put two or three Penrose drains inside each other. It's a good scheme. A drain should not be placed directly down to the closure area. A single Penrose through the operative wound may announce a reopening of the perforation which might go unnoticed and undiagnosed in a stormy convalescence of a tightly closed case. Reopening of the perforation I have seen occur in both the drained and undrained.

MORTALITY

The mortality varies greatly (6 to 60 per cent) in different clinics and from time to time in the same clinic. The chart shows the percentages from widely separated hospitals. The causes of death quite naturally group themselves into three classes: those that die within the first one to three days from the collapse so commonly called "shock"; those that die in the second period from the toxemia of peritonitis; and those that die weeks or months afterwards from residual infections or abscesses within the abdomen or thorax—sub-phrenic, pelvic, hepatic or pulmonary—or thoracic empyema.[15] The mortality table of our cases follows, with the postmortem findings.

EARLY AND LATE RESULTS

I have reserved the report of the results obtained in the review of this group for the second section of the paper. It is my hope to gather the histories, the records of physical examinations, and the *x*-ray data to show you at a later meeting. Possibly, also to bring before you some of the patients themselves. The tables of results from several clinics are appended.

CONCLUSIONS

1. A clinical study of a series of acute perforated duodenal ulcers suggests several research problems that might aid in increasing our knowledge of the pathogenesis of ulcer in general, and that might help in reducing the morbidity and mortality of perforation itself.

2. Perforation occurs largely in chronic ulcer and is thus preventable in a larger number of cases. Wider publicity is needed to make the diagnosis readily recognized in the average case.

3. Standardization of the treatment is difficult and possibly not desirable.

4. Causes of death are variable and fall into three classes: those dying during the first to third days, or early collapse period, the intermediate or peritonitis period, and, finally, the late, residual abscess group.

5. The variability in the reports of late results from the larger hospitals adds to the uncertainty regarding the efficiency of our present method of treatment.

I wish to thank the management of the hospital, the chiefs of the two surgical services, and the various associate surgeons for the privilege of reporting these cases.

BIBLIOGRAPHY

1. Stewart, G. D., and Barber, W. H.: Acute perforated ulcer of stomach and duodenum. Ann. Surg., Phila., 1922, lxxv, 349-355.
2. Balfour, D. C.: Report of surgical procedures of the stomach and duodenum for 1928. Proc. Staff. Meet. Mayo Clinic, Rochester, Minn., 1929, iv, 62-63.
3. Brenner, E. C.: Perforated ulcers of duodenum; study of 27 cases. Am. Jour. Surg., N. Y., 1927, iii, 381-385.
4. Moynihan, B.: Perforation of gastric and duodenal ulcer. Practitioner, Lond., 1928, cxx, 137-174.
5. Personal communication.
6. Gibson, C. L.: Acute perforation of stomach and duodenum. Jour. Am. Med. Assn., Chicago, 1928, xci, 1006-1008.
7. McCreery, J. A.: Acute perforated ulcer of stomach and duodenum. Ann. Surg., Phila., 1924, lxxix, 91-99.
8. Pool, E. H., and Dineen, P. A.: Late results of gastro-enterostomy for gastric and duodenal ulcers, including acute perforated ulcers. Ann. Surg., Phila., 1922, lxxvi, 457-466.
9. Smith, F. K.: Diagnosis and treatment of perforated duodenal ulcer. Brit. Med. Jour., 1921, ii, 1068.
10. Lewisohn, R.: Late results in perforated gastro-

Mortality Table with Post Mortem

Minneapolis General Hospital

Year	Type of Ulcer	Procedure	Post-operative Complications	Died	Post Mortem
1924	Old calloused ulcer	Polya—Time after perforation?	Duodenal fistula	23 days P-O	Diagnosis—generalized septicemia—drain leads to blind end of duodenum. Anastomosis O. K.
1924	Chronic ulcer	Posterior—Polya—Time after perforation?	Empyema infected operative area.	108 days P-O	Diagnosis—diffuse purulent peritonitis. Double empyema. Pus along suture. Anastomosis.
1924	Chronic ulcer	Closure only—10 hours after perforation.	Vomiting for 2 days. Pneumonia 4th day.	7th day P-O	Diagnosis—Pulmonary embolism. No post mortem.
1925	Chronic ulcer	Closure with G. E. 7 hours after perforation.	Possible pulmonary complication.	2nd day P-O	Sudden collapse. Death. No post mortem. 1—Peritonitis. 2—Interstitial pneumonia
1925	Chronic ulcer	Closure only 3½ hours after perforation.	Severe "shock." Cheyne-Stokes resp. in A. M.	1 day P-O	No post mortem. Diagnosis—general peritonitis. Surgical shock?
1926	Chronic ulcer	Closure. Post G. E. Time after perforation?	Vomiting blood next day.	52 days P-O	Perforation of gastro-jejunal ulcer. Peritonitis.
1926	Chronic ulcer	No operation.	Died 2 days after admitted.	2 days P-O	Chronic ulcer. Death from hemorrhage.
1926	Chronic ulcer	Closure with Post. G. E. 10 days after perforation.	Broncho-pneumonia 3 days post-operative.	13 days P-O	Diagnosis—Broncho-pneumonia. No post mortem.
1926	Chronic ulcer	Ulcer not operated. Appendix removed.	Stormy course. Simulated peritonitis and ileus.	8 days P-O	Post mortem—small amount of exudate in peritoneal cavity. Ulcer adherent to liver.
1926	Chronic ulcer	Operated 54 hours after perforation. Closure—Abdomen full of pus.	Did not rally.	2 days P-O	No post mortem.
1926	Chronic ulcer	Closure—Post. G. E. 6½ hours after perforation.	2nd day broncho-pneumonia. General peritonitis.	3 days P-O	Diagnosis—Peritonitis, broncho-pneumonia. No post mortem.
1926	Chronic ulcer	Operated 9 hours after perforation. Excision of diamond-shaped area with closure and omental graft.	O. K. to 9th day, then condition became poor.	10 days P-O	Post mortem. 1—Fibrino-purulent peritonitis. 2.—Resection wound open 3—"Kiss" ulcer found on posterior wall.

MORTALITY TABLE WITH POST MORTEM—*Continued*

Year	Type of Ulcer	Procedure	Post-operative Complications	Died	Post Mortem
1928	Chronic ulcer	Large perforation. Closure and omental tag. 3 days after perforation.	Stormy post-operative course. Supra-pubic drain put in 2nd P. O. day. Marked gastric retention. Evisceration.	3 days P-O	No post mortem. Diagnosis—General peritonitis.
1928	Chronic ulcer	Closure and detached omental tag. 24 hours after perforation.	2nd day broncho-pneumonia.	5 days P-O	Post mortem— 1.—Perf. duodenal ulcer. 2—"Kiss" ulcer. 3—General fibrino-peritonitis. 4—Broncho-pneumonia. 5.—Cloudy swelling.
1928	Chronic calloused ulcer	Closure with post G. E. omental tag. 24 hours after perforation.	26 days O. K. then sepsis began. All symptoms of pyemia. Stomach O. K. all through.	41 days P-O	Post mortem— 1—subphrenic abscess. 2—Pyemia with abscesses. 3—Purulent pleuritis. 4—Chronic ulcer. Duodenum-peritoneal surface showed no signs of injury.
1928	Chronic ulcer	Horsley pyloroplasty. 3 hours after perforation.	Purulent drainage from wound. Empyema drained at 2 different times	63 days P-O	Post mortem— 1—Pyopneumothorax. 2—Pulmonary atelectasis. 3—Careful search of stomach and intestines failed to show any ulcer or operative scar.

duodenal ulcers. Ann. Surg., Phila., 1928, lxxxvii, 855-860.
11. Collinson, H.: Some present-day problems in the surgery of gastric and duodenal ulcers. Jour. Am. Med. Assn., Chicago, 1914, lxiii, 1184-1190.
12. Deaver, J. B.: Posterior gastro-jejunostomy in acute perforative ulcer of the stomach and duodenum. Jour. Am. Med Assn., Chicago, 1913, lxi. 75-80.
13. Garlock, J. (Discussion: E. C. Brenner): Am. Jour. Surg., N. Y., 1927, iii, 385.
14. Wilensky, O. A. (Discussion: E. C. Brenner): Am. Jour. Surg., N. Y., 1927, iii, 385.
15. Stenbuck, J. B.: Causes of death following operations for perforated gastric and duodenal ulcers. Ann. Surg., Phila., 1927, lxxxv, 713-721.

DISCUSSION

DR. C. B. WRIGHT: I appreciate the opportunity to hear this careful and thorough paper and congratulate Dr. Olson on being able to report such a large series of cases. A medical man can contribute little to the diagnosis or treatment of perforations as this is a surgical field purely, and results will depend upon the early resort to surgery. My own impressions are that this is not nearly as common an accident as some of the statistics would lead us to believe. Surgeons like Moynihan and Gibson see many of these cases because they have difficult abdominal cases referred to them. I have asked before a number of medical societies how many cases each man had seen, and the reports indicated that men in general practice have seen only a rare case and many none at all. I have inquired among surgeons in regard to this matter and none of them over a long period of surgical work had operated on more than fifteen cases in private practice. Therefore, I think that the statistics one reads are somewhat misleading.

In my practice, I have personally come in contact with nine perforated ulcers. Six of these were perforated duodenal ulcers. Two were seen about sixteen hours after the onset and died following operation. Two recovered from the operation. According to reports one died three years later from hemorrhage, and another six years later of gastric tetany. Two others are living but have had recurrent attacks of ulcer trouble over periods of ten and twenty-two years. Three were perforated gastric ulcers. Two of the gastric cases were operated and remained well. The third refused operation and died of general peritonitis. These

cases usually are emergencies and call the nearest medical help. Unfortunately we are not all Moynihans and Gibsons. Men who see only a very rare case of perforation naturally do not at once think of this accident. More often the patient himself hesitates to jump on the operating table but begs for relief of his pain and a few hours to let the storm pass over. Morphine may be given and a period of comparative comfort may last until the onset of general peritonitis.

As regards ulcer in general the treatment of the patient is just as important as the treatment of the ulcer. Foci of infection, generally believed as the most common inciting cause, should be removed as soon as possible. Proper advice should be given as to diet, which should be balanced in every way with sufficient vitamin content, yet non-irritating. There should be proper periods of rest and sleep and attention paid to the nervous system. There is evidence to support the view of Hurst that certain individuals have a tendency to ulcer formation, the so-called "ulcer diathesis." Therefor the patients should be impressed with the fact that they are liable to have recurrence of the old ulcer or the development of new ones.

Finally, ulcers cannot be treated on the basis of statistics from large clinics. Each case is an individual problem and should be carefuly studied from every angle before the type of treatment is decided upon. All cases treated should be interviewed at regular intervals as long as possible after a so-called medical or surgical cure.

Dr. O. H. Wangensteen: Dr. Olson is very deserving of commendation for his thorough discussion of this subject. There were several points in Dr. Olson's paper that interested me. First, the mortality: The mortality in perforated duodenal ulcer is a measure of the delay that has intervened between perforation and operation. We count mortality in appendicitis in days, but in perforation of the stomach or duodenum, the mortality rises with each hour lost.

In a typical case, anyone can make a diagnosis with relative ease, but in an atypical case it may be difficult. A board-like abdomen following a sudden severe abdominal pain means perforation. The early pain is usually as severe as any that the patient may subsequently suffer. I have a plate here I would like to show. The patient is a male about fifty-one years of age. Four years ago, he was in the University Hospital and a diagnosis of neurosis was made. About two weeks ago, while at work in his occupation of "barbering," he suffered a severe attack of pain in his abdomen, which lasted just a short time. He went about his business and had no further trouble. Five days later, about three o'clock in the afternoon, he had another severe attack. He called his doctor. His abdomen was rigid, but no findings of a peritonitis developed. Five days after this acute trouble, he was sent to the University Hospital. We felt he had an acute perforation of a duodenal or gastric ulcer.

The abdomen, on admission, was moderately rigid throughout but more marked above. The pulse was not unduly rapid, and the man, on the whole, looked fairly well. No free gas could be percussed in the peritoneal cavity. Fluoroscopic examination also failed to show free gas in the abdomen. When a little barium was given by mouth, it was found that the stream shot out of the superior portion of the duodenum into this pocket shown here on the radiograph. In view of the localized and well walled-off perforation, we felt it safer to temporize and not risk contamination of the general peritoneal space. A gastroenterostomy was done for this man about six weeks later, at which time dense adhesions were found in the upper right quadrant.

Another patient, aged about 30, at present on the medical service at the hospital, is of interest in this connection. About two months before her admission to the hospital, she had acute pain in the abdomen. There was no history of ulcer. Free gas could be demonstrated in the peritoneal cavity. She is not ill now; pulse and temperature were normal, and there was no evidence of ulcer. The most likely occurrence here, I should think, would be a minute perforation. Why the gas has not been absorbed, of course remains unexplained. There are no gaseous cysts in the abdomen; there has been no severe trauma or antecedent operation to account for the presence of this free gas. Another remote possibility may be that air has been admitted to the peritoneal cavity through the vaginal canal by way of the uterus and Fallopian tubes.

These two cases illustrate the difficulty one can have in making a diagnosis in atypical cases.

The question of shock in perforation has been of interest to me, and we have investigated it a little from the experimental standpoint. I have never had the opportunity to see a patient directly after perforation. I have seen them two or three hours later. Then the pulse and blood pressure are usually normal. I don't know whether any observations have been made on blood pressure in such cases immediately following perforation.

It is my impression that the collapse that attends perforation is dependent upon a peritoneal reflex. I don't believe that the amount of hydrochloric acid that escapes into the peritoneal cavity, if injected directly into the blood stream, would cause shock. By injecting mustard oil into the peritoneal cavity of a rabbit, we have been able to demonstrate in the blood pressure tracings a fall in the blood pressure in some animals, and especially if the injection is made when the animal is allowed to awaken from the anesthetic. Anesthesia, of course, abolishes reflexes. A peritoneal reflex would be dependent on a nervous mechanism, and nervous reflexes are known not to be constant.

SACRAL ANESTHESIA*

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WITHIN the past two or three years sacral anesthesia has grown in popularity as the choice of anesthesia for operative work in the perineal region. To me it is the ideal type of anesthesia for rectal operations involving the hemorrhoidal and peri-anal region. It is simple of execution, as nearly devoid of danger as any other type of anesthesia and produces a degree of relaxation of the tissues which cannot be secured under general anesthesia. Over infiltration anesthesia it possesses the advantage of not distorting the field of operation and there is no danger of later hemorrhage such as may occur from an overlooked vessel where solutions containing adrenalin are used for infiltration anesthesia. It also possesses the advantage that the entire amount of anesthetic solution is injected with only one insertion of the needle, where several are needed to infiltrate. I believe that where alarming symptoms have occurred following sacral anesthesia it has been due in most cases to improper technic or the use of solution of improper amount or strength.

Various men use various solutions. The amounts seem to vary between 15 c.c. of a 3 per cent novocain solution to 90 c.c. of a 1 per cent solution. Adrenalin may or may not be added. There are certain definite disadvantages in using the large amounts of solution. It has been shown that 75 c.c. of solution injected through the sacral hiatus will sometimes extend as far as the third cervical vertebra, 30 c.c. to the ninth thoracic, 20 c.c. to the twelfth thoracic. With a 1 per cent solution at least forty to fifty c.c. are necessary for anesthesia and in many cases considerably more is needed. With the large amounts, very serious reactions consisting of a rapid thready pulse, respiratory embarrassment or collapse may occur. This is probably due to the effect on the nerves higher up along the trunk. Since only anesthesia of the perineum is required, theoretically at least, it is not necessary that the anesthetic solution extend above the lumbar region at the highest.

I had two patients who developed very alarming symptoms during the time I was using larger amounts of solution. Berry of Baltimore uses 20 c.c. of a 3 per cent solution without adrenalin and reports success in 86 per cent of his cases. While no doubt this is an ideal solution from the point of view of amount used, I consider any solution which will give only 86 per cent of successes as unsatisfactory. My own percentage of success was about the same as his with this amount and concentration of solution. After trying various solutions I now use 30 c.c. of a 2 per cent novocain solution to which .2 c.c. of 1-1000 adrenalin has been added. The amount of novocain solution is varied in individual cases between 20 and 40 c.c. This clinically produces results and I have had no severe reaction since using this solution. I believe the use of adrenalin is correct except perhaps in a few cases of cardio-vascular disease and hyperthyroidism. It prolongs anesthesia, slows up the absorption of the novocain and is a prophylactic against the type of reaction which most commonly occurs. Martin of Detroit has shown that the use of veronal also lessens the danger of toxic effects of the novocain and I have also added this to the method I employ.

Two types of reaction may occur with this type of anesthesia but as stated above I believe that there is no occasion for them to occur except perhaps in a very mild and transitory form, if the procedure is properly carried out. I will, however, describe them. The first type is by far the most common and is said to constitute 85 per cent of the cases which show reaction. In this type the patient complains of a sensation of weakness, is apprehensive and nauseated. The face is pale and perspiration stands out on the forehead. The eyes have a staring look and cerebration is retarded. The pulse rate falls along with the blood pressure. In severe cases vomiting or unconsciousness may occur. This type of reaction is controlled very quickly and effectively by the intramuscular injection of 1-1000 adrenalin in doses of 10 to 30 minims. Since adding adrenalin to the anesthetic solution I

*Read before Monthly Meeting of the Northwestern Hospital Staff, Minneapolis, May 8, 1929.

have not had a reaction severe enough to need any treatment of any kind.

The second type of reaction occurs very infrequently. This type shows restlessness, excitement, flushing of the face and acceleration of the pulse. Breathing is deep, the blood pressure raised and involuntary twitchings and unconsciousness may occur. This type is probably a true novocain intoxication. The treatment is simply to reassure the patient and keep him quiet. If the blood pressure is high amyl nitrite may be used.

I know of no complications which may develop later, except in one case an abscess was reported, but this no doubt was due to some error in asepsis.

Anesthesia is usually supposed to fail in about fifteen per cent of cases. I believe that anesthesia should be secured in approximately 100 per cent of cases where there is no anatomical anomaly which prevents the proper carrying out of the procedure. I believe that almost the only reasons for not securing anesthesia is that the needle is not in the sacral canal, enough solution is not used or sufficient time is not given. At least since our present plan we have had only one failure and I now believe that this was due to the fact that the needle was not in the canal. Unilateral anesthesia sometimes occurs. Lundy thinks this is due to the fact that the needle is not in the center of the canal. I think the most likely explanation is that the needle tip gets behind some bit of fascia or tissue and balloons out that side of the sacral canal but shunts the main part of the solution upward without filling out the canal proper. The chief evidence that the needle is in the caudal canal is the free flow of fluid from the syringe. A tingling down the thighs and legs sometimes occurs but not always, and later of course there is anesthesia of the perineum. Of course the aspiration of spinal fluid or blood is also evidence, but of an unwelcome sort.

Evidence that the needle is not in the canal is persistent resistance to the introduction of the solution, tumefaction from injection into the soft tissues over the sacrum and lack of anesthesia.

I claim no originality in the procedure employed for it is a combination of several ideas and for that reason a brief description is perhaps justified.

As a preliminary, five grains of veronal is given the night before and five grains one hour before the operation. A hypodermic of 1/6 to ¼ grain of morphine is given one half hour before operation. The patient is placed in a comfortable position, lying on the abdomen. If the sacrum is prominent he lies flat on the table; if not, a pillow is placed under the hips. The skin is cleansed with iodine and alcohol. The sacral hiatus is located in the usual way. With a fine needle the skin over this area is infiltrated with the procain solution and the needle is then inserted downwards and the tissues about the hiatus injected and about 1 c.c. injected into the hiatus. I believe this lessens the discomfort when the spinal puncture needle is later inserted. A spinal puncture needle is now inserted through the membrane covering the sacral hiatus. The distal part of the needle is depressed, so if possible the needle passes in through the center of the sacral canal and does not pierce the plexus of veins which lie against the bony walls of the canal. The needle tip is usually inserted about two inches, although in some cases anesthesia is secured to better advantage if the needle is not inserted so far. The stilet is now withdrawn from the needle and aspiration is done to see if either blood or spinal fluid is obtained. If blood is obtained the needle point is moved until no blood is withdrawn. If this is not done, intravenous injection of the solution may occur. If spinal fluid is obtained I believe it is best not to continue the procedure but to use another type of anesthesia. A number of men think that in this case the needle should simply be moved about until no spinal fluid is obtained and the injection continued. I know personally of one case in which this was done and when the solution was injected the patient promptly died. Obtaining spinal fluid is a rare occurrence. I have encountered it but once and in this case I discontinued the caudal procedure and had the patient given ethylene.

With the needle inserted in the canal and no spinal fluid or blood obtained the solution is injected. This is done slowly, the entire procedure taking usually from ten to fifteen minutes. I believe the slow injection is important. Certainly the number and severity of reactions may be reduced by slow injection. At first 2 c.c. of solution is injected. For some reason this small amount will give a slight reaction but as soon as

it has passed away the entire amount may be injected with no further trouble. The solution is injected at the rate of about 2 c.c. a minute until 20 c.c. have been injected. The anal region is then watched for any relaxation of the sphincter. If this begins we are sure that anesthesia will be secured. If, however, at the end of twenty minutes from the onset of injection there is not some evidence of this, another 10 c.c. of solution is injected. The needle is left in position so that if anesthesia is not secured at the end of forty-five minutes, more solution may be injected. This is not done until the needle's position is changed, for I believe if as much as 30 c.c. of solution is injected into the proper area anesthesia will be secured. Lack of anesthesia from this amount is sufficient evidence that the solution has not been properly placed. As before stated there has been only one case of lack of anesthesia, and no alarming reactions since following this routine.

In conclusion I wish to say that it is my opinion that with the present standardization of caudal anesthesia, it is the safest and most satisfactory anesthetic for the majority of cases requiring surgery of the perineal region.

BIBLIOGRAPHY

1. Berry, G. P.: Caudal epidural anesthesia in perineal surgery of the genito-urinary tract. Jour. Am. Med. Assn., 90:1018 (Mar. 31), 1928.
2. Labat, G.: Regional anesthesia. Saunders Company, 1928.
3. Lundy, J. S.: Method of producing block anesthesia of sacral nerve. Am. Jour. Surg., 4:262 (March), 1928.
4. Lundy, J. S., and McCusky, C. F.: Sacral anesthesia in operation on the rectum. Atlantic Med. Jour., 30:14 (Oct.), 1926.
5. Martin, E. G.: Local anesthesia agents; preventive and emergency treatment of toxicity. Trans. Am. Proc. Soc., 1928.

YEAST AND PUFFERY

The British Medical Journal has called attention to some "highly objectionable advertisements of a proprietary brand of yeast" that were appearing in American and Canadian periodicals. These advertisements are stated to have been of the testimonial type and purported to be signed by European or American medical men. While not mentioned by name, it seems quite obvious that the British Medical Journal referred to the blatant series of advertisements that the "Fleischmann's Yeast" concern has been running recently. As a result of the editorial comment, a well known London physician has written to the British Medical Journal that he was asked to write a testimonial extolling the virtues of yeast, this testimonial to appear with his name and photograph in magazines and newspapers, and was offered the sum of one hundred fifty pounds ($750). The physician did not accept the offer of the advertising agent. The following American physicians' names (and pictures) have been used by the Fleischmann people in their recent advertising campaign: "Dean H. H. Rusby, M.D., Professor of Physiology, College of Pharmacy, Columbia University." "Dr. George Parrish, well known Health Officer of Los Angeles." "Dr. Ira L. Hill, prominent New York physician and abdominal surgeon." (Jour. A. M. A., June 15, 1929, p. 2025.)

ELIXIR KACYAN McNEIL AND TABLETS KACYAN McNEIL NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that it decided not to admit potassium sulphocyanate to New and Non-official Remedies because the evidence for its therapeutic value is inconclusive. However, in view of reports in which reduction in pressure is clinically desirable, the Council holds that further consideration should be given the drug and voted to publish this report, stating the limitations of therapy with potassium sulphocyanate, namely: that the evidence for its value is far from conclusive; that in many patients the production of lowered pressure does more harm than good; and that its use is contraindicated in acute inflammation of all types, in nephritis and in marked renal insufficiency. The Council also reports that Elixir Kacyan McNeil and Tablets Kacyan McNeil are the proprietary names under which Robert McNeil, Philadelphia, markets an elixir and tablets of potassium sulphocyanate and that these are unacceptable for New and Non-official Remedies because the evidence for the value of potassium sulphocyanate is inconclusive and because the marketing of this drug under a proprietary name is contrary to the interests of rational therapy. (Jour. A. M. A., June 1, 1929, p. 1838.)

GENERAL TREATMENT OF TUBERCULOSIS*

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THE treatment of tuberculosis is such a many sided affair that in a short description of it many points of interest will necessarily be omitted.

The essential treatment of tuberculosis is very simple, so simple, in fact, that it requires a large amount of resourcefulness on the part of the physician to keep the patient on the "cure."

Without the time-tried remedies of rest, fresh air and proper food there is no cure for tuberculosis. The greatest of these remedies is rest. Without air and food life is impossible, but without rest the treatment of tuberculosis is futile.

The treatment of tuberculosis can best be applied in a sanatorium where the patient is subject to rules of a semi-military character, is under constant medical supervision, protected from well meaning but harmful advice-dispensing friends, surrounded by understanding associates, protected from many tempting lapses from the "cure" and where fresh air, good food and rest are not only constantly insisted upon but intelligently applied.

A patient with the usual, uncomplicated case of tuberculosis requires about the same amount of food that a healthy, active person does. The food problem is solved by the factors of sufficient quantity and variety. A variety, including fresh, green foods, assures the vitamin requirement.

The fresh air requirements of the patient can best be met by a well screened porch adjacent to a room into which the patient can be moved for bathing, dressing and for protection during bad weather. If such a porch is not to be had, the next best thing is a room with one or more large windows, the sashes of which have been removed, having screens and a canvas curtain at hand to keep out rain and snow.

Rest should be continuous as long as there is fever. If the patient has had a far advanced case of tuberculosis, the rest should continue for several months after the fever has subsided. Rest should be both mental and physical and should be as nearly perfect as possible.

A patient with fever should be supine in bed all of the time, not even being permitted to sit up in bed, let alone getting up for baths or to go to the toilet. A thorough understanding of tuberculosis and having witnessed the dire effect of too early a return to exercise are great aids in making one a safe judge as to the proper time for the patient to begin taking exercise.

Exercise should be limited to two or three minutes per day at first and gradually increased as the reaction of the patient warrants.

The thermometer should be used as a general guide in prescribing exercise. A rise in temperature of .5 of a degree F. or more that does not subside within about thirty minutes after quietly resting on a bed or couch, may be considered as an indication that the patient has had too much exercise. At first, even the act of sitting up in bed with the aid of a back-rest must be considered as "exercise." After the patient has been able to sit up in a chair for two or three hours he may begin to take walks, starting with a two or three minute walk. Walking, properly prescribed and taken, is one of the safest and best forms of exercise for the tuberculous patient.

Air-baths, natural sun and artificial-light baths, occupational therapy, suitable forms of amusement and all safe methods of helping to establish and maintain the "proper mental attitude" should be employed as conditions seem to require them.

Artificial pneumothorax, thoracoplasty, phrenicotomy and other forms of chest surgery are all life-saving measures, when used by men familiar with their limitations, and on properly selected patients.

All forms of tuberculous complications should be watched for and promptly treated, especially the more common ones such as pleurisy, empyema, laryngitis, enteritis, peritonitis, ischiorectal abscess, hemoptysis and tuberculosis of the glands.

The treatment of pleurisy and hemoptysis may be touched upon at this time as they are perhaps

*Read at the Tuberculosis Institute, held under the auspices of the Minnesota Public Health Association, Ah Gwah Ching, Minn., May 2, 1929.

the two complications that the general practitioner is most commonly called upon to take care of.

Simple dry pleurisy is best treated by the administration of salicylates and the application of mustard plasters or tincture of iodine. In cases of acute pleurisy, before the effusion appears, it may be necessary to administer morphine but at times strapping the chest with adhesive plaster will relieve the pain. Ordinarily, it is not advisable to tap fluid in tuberculous pleurisy unless it is of such extent as to cause severe dyspnea or other urgent symptoms. Even then, only 20 or 30 c.c. at the most should be withdrawn at a time. Sometimes the re-injection of 10 c.c. of the fluid into the subcutaneous tissues of the chest wall (autoserotherapy) every other day, repeating several times, will stimulate the absorption of the effusion.

In hemoptysis the patient should be placed in a semi-sitting position for the reason that expectoration, administration of medicines and the care of the patient during vomiting are facilitated. In bleeding of small amount, the above position and a few words of encouragement are all that is necessary. Hemorrhages of larger amounts require, in addition, the administration of 5 to 10 grams of table salt or 2 to 3 grams of sodium bromide three or four times a day. In extremely nervous patients or in cases with troublesome cough, morphine is an excellent remedy. If, in spite of these measures, the bleeding is very persistent or very copious it may be necessary to resort to artificial pneumothorax if it can be ascertained from which side the hemorrhage comes.

Just because a patient has tuberculosis is no reason why he cannot have other diseases; therefore one should be on the watch for non-tuberculous complications when the patient complains of unusual symptoms. Special attention should be given to the teeth, tonsils, eyes and nasopharynx and all regions that are likely to be the source of focal infection.

Education of the patient in all matters relating to tuberculosis is another essential point in the treatment of the disease. Tuberculosis cannot be cured without the coöperation of the patient and the patient cannot properly coöperate unless he has a good understanding of the disease.

To begin with, the patient should be informed that he has tuberculosis and that even though the prognosis may be favorable, he must not expect a cure within a few months. It is far better to tell him at once that, in all probability, the cure will be a matter of two or more years, than to give him the false impression that he will be well in two or three months only to be bitterly disappointed and perhaps very seriously discouraged.

Tuberculosis is one of the most curable of all diseases and one that most frequently relapses. The frequency of relapse, I think, is largely due to the neglect of properly educating the patient and to the spending of an insufficient length of time in finishing up the "cure."

BISMUTH IN SYPHILIS

The principles that apply to the selection of water-soluble as compared with oil-suspended insoluble preparations of bismuth in the treatment of syphilis would not seem to be essentially different from those now recognized for the use of mercury preparations except for the fact that bismuth preparations in general are pharmaceutically more eligible than are the corresponding mercurials. A water-soluble bismuth salt should be selected when a rapid transient effect is desired, and the administration of such a preparation should be more frequent than that of an oil suspended insoluble one. (Jour. A. M. A., June 22, 1929, p. 2123.)

THALLIUM POISONING

Three children died recently in London from poisoning by thallium acetate administered for ringworm of the scalp. This is an additional indication of the growing importance of thallium compounds as a dangerous poison. The first therapeutic use of thallium was to check sweating. Its action in causing a loosening and falling out of the hair was a "by-product" and most of our information about its other and more general poisonous effects in man has been obtained from its employment in epilation. Thallium is closely related chemically to mercury and lead. Although they appear earlier, the symptoms of chronic thallium poisoning are more like those produced by arsenic than by these other metals. (Jour. A. M. A., June 1, 1929, p. 1865.)

DIABETES MELLITUS AND ARTERIOSCLEROSIS*

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THE interrelationship between diseases of metabolism and diseases of the degenerative type is rapidly coming into the foreground in medical interest, particularly in connection with arteriosclerosis. To offer definite conclusions in this field is almost as difficult as to obtain undisputed observation in the field of constitutional types and diseases.

In clinical investigation, there are two main methods of approach: first, the statistical evidence about the frequency of the simultaneous occurrence of two or more definite pathological findings. This in biometrical terms is a demonstration of a high coefficient of correlation. It does not, however, tell anything in regard to the question of cause and effect. To throw light on the question of cause and effect, our second method is needed; *i.e.,* clinical information as to the time relationship between the occurrence of the different diseases. The relationship between diabetes and arteriosclerosis constitutes one of the most important problems of this type. Clinically, it is often difficult to distinguish the cause from the effect. This is particularly the case in the older diabetics where the onset of diabetes seems to closely coincide with the age of the development of arteriosclerosis.

In this communication the observation will be reported in a young man where the onset of diabetes mellitus preceded the symptoms of degenerative disease by ten years, and where our observations are unusually rich and dependable due to frequent hospitalization of the patient.

W. W., University Hospital, No. 30006 and No. 40924, white, male, age 33.

Family History.—Father living and well, 70 years old. Mother dead at 50, cause unknown. Six brothers and sisters living and well. One maternal uncle has diabetes, but is controlled on a qualitative diet.

Past History.—During his childhood he had measles and chickenpox and had two attacks of influenza which were very mild and he was frequently subject to colds. Otherwise his health was comparatively good until the age of nineteen, when he developed a series of boils and carbuncles. This continued with increasing severity until the age of twenty-two, when for the first time a urine analysis was made and the diagnosis of diabetes mellitus was made. His diabetes was controlled by diet without insulin. At the age of twenty-five he had a mild attack of influenza. At the age of twenty-six he developed a chancre, and for two years he was energetically treated for syphilis. At the age of twenty-eight his home was broken up and he was unable to live on his regular diet. He was soon forced to quit work because of loss of strength and symptoms of uncontrolled diabetes mellitus. This continued until the age of thirty, when he entered the University Hospital on August 9, 1924.

Physical Examination.—The patient is a well developed, well nourished man, thirty years of age, the picture of health. Height 5 feet 9 inches, pulse 90, respiration 18, temperature 98.6. The skin is warm and moist, with white spots about the body and neck, the result of numerous boils. Head normal, eyes normal, pupils react normally. Mouth—considerable gingivitis, pharynx reddened, tonsils small but inflamed, neck normal. Chest: normal shape, expansion good, no lagging, no deformities. Lungs within normal limits. Heart: apex beat not seen, but felt at the fifth interspace inside the midclavicular line. No palpable thrill present. Heart within normal position and size; no murmur heard. Radial arteries fairly easily collapsible. Blood pressure 135/88. Abdomen within normal limits. Extremities — muscular strength good, no spasms. Joints normal. Reflexes within normal limits. Diet on admission was: carbohydrate 40, protein 30 and fat 90. This was gradually increased until he was receiving carbohydrate 80, protein 50 and fat 150 with 10 units of insulin. Insulin was gradually discontinued and he was discharged on the same diet without the use of insulin.

Laboratory Examination. — Urine—specific gravity varied from 1.005 to 1.018, 1+ albumin, sediment contained a few white blood cells, otherwise negative. Acetone and diacetic acid absent. Blood sugar on admission .405 mgm.; lowest was .178 mgm. Blood urea nitrogen 14, creatinine 1.3, Wassermann negative.

After his discharge from the hospital he continued his usual occupation and was gradually able to go on a qualitative diet. In 1926 he noticed that his ankles were slightly swollen in the evening. This continued to increase in severity until the early part of July, 1927, when he was forced to stop his work because of the marked edema, and by the 13th of July it was necessary for him to be confined to bed. At this time he noticed he was getting rather dyspneic. He did not improve with rest in bed but became progressively worse. He was readmitted to the University Hospital July 30, 1927.

*From the University Hospital, Department of Medicine. These cases are published through the courtesy of Drs. Hilding Berglund and Henry L. Ulrich.

Physical Examination.—Middle aged man lying uncomfortably in bed. Temperature 98.6, pulse 90, respiration 20. Face somewhat puffy, numerous pigmented scars over the chest, neck and body. There are numerous brownish red ulcerations over his body which Dr. H. E. Michelson diagnosed as pyoderma. No ulcerations on the extremities. There is marked edema of the legs. Edema of the genitals and moderate edema of the back. Eyes: pupils regular, react to light and accommodations. Nostrils wide, scars of small ulcerations in the left nostril. Tonsils small, pharynx and neck normal. Lungs—moist râles in both bases; evidence of free fluid in the right base. Rhythm regular except interrupted by occasional extrasystoles. First and second sounds are distinct at the apex. Heart: Ml. 12.5 cm., Mr. 6.5 cm., the arch 3.8 cm. There was a systolic murmur heard at the apex. Blood pressure 130/110. The abdomen is sufficiently distended to suggest moderate ascites and there is shifting dullness. Liver and spleen not palpable. Rectal examination negative.

Ophthalmoscopic Examination.—Examination by Dr. F. E. Burch revealed complete obliteration of numerous fine arteries in the right eye and complete compression of a big vein in the left eye, causing thrombosis of this vein. There was a marked beading of the arteries and there was marked arterio-venous crossings. There was a spot of white, interpreted as diabetic exudate.

X-ray Examination. — *X*-ray of the extremities showed a moderate calcification of the arteries of the legs and arms. A six foot plate of the heart showed a marked generalized dilatation of the heart. Cardiac measurements were: transverse thoracic 29 cm., Ml. 12.5 cm., Mr. 6.5 cm., total 19 cm., longitudinal 12 cm., arch 3.8 cm.

Laboratory Findings.—Urine specific gravity varied from 1.014 to 1.028. On admission 8 per cent sugar (which gradually cleared up with treatment), many hyaline casts, many red blood cells, occasional leukocytes and positive acetone and negative diacetic. The acetone gradually disappeared on treatment. He was made sugar-free, but microscopic examination of the urine remained practically the same. His blood was 70 per cent hemoglobin, 4,620,000 red blood cells, 10,650 white blood cells, p.m.n.'s 84 per cent, lymphocytes 14 per cent and monocytes 2 per cent. Stool examination was negative. Blood sugar varied from .130 mgm. to .2 mgm. Blood urea nitrogen varied from 49 to 75 just before death. Fluid by thoracocentesis: specific gravity 1.015, albumin 1.5 per cent, 24,000 white cells per 1 cm., red blood cells 7,000. Guinea pig inoculation negative. Wassermann negative.

Electrocardiogram Examination.—Electrocardiogram presented the findings diagnosed as coronary disease, arborization block and extrasystoles.

Diet.—His diet while in the hospital was 50 carbohydrate, 50 protein and 120 fat. He remained sugar free without the use of insulin.

In spite of the use of various diuretics and digitalization he continued to run a course of cardiac decompensation and died August 28, 1927.

Clinical Diagnoses.—Arteriosclerosis, diabetes mellitus, myocardial failure, arteriosclerosis, coronary disease with thrombosis, pericarditis, generalized anasarca, latent syphilis, and benign hypertension.

Postmortem Examination.*—The body is that of a well developed, well nourished white adult male, 178 cm. in length and weighing about 160 lbs. Rigor is present; there is purplish hypostasis posteriorly; edema is noted in the face, arms, both legs, scrotum and penis; slight cyanosis is present in the lips; there is no jauundice. Each pupil measures 3 mm. in diameter; they are equal and regular. Numerous skin lesions are noted on the arms and chest. These are necrotic in the center, measure 1.5 to 3 cm. in diameter.

The peritoneum is smooth and glistening and the cavity contains about 2 liters of straw-colored fluid. The appendix is anterior and free. The diaphragm is at the fourth interspace on both sides. The right pleural cavity contains about a liter of cloudy fluid in which there are many flakes of fibrin. The left cavity contains about one liter of straw-colored fluid. The pericardium is smooth and glistening except on the right side, where it is covered with fibrin. The cavity contains about 200 c.c. of fluid in which are many flakes.

The heart weighs 440 grams. The myocardium is soft and pale. Both ventricles are dilated. The left ventricle shows a considerable amount of hypertrophy. The descending branch of the left coronary is calcified and the wall is markedly thickened. The lumen in places is almost obliterated. The right coronary artery shows extensive thickening but of less degree than in the left. About 7 cm. from the orifice of the right coronary the artery is thrombosed. A thrombus is present in the appendix of the right auricle. There is an extensive thrombosis in the apex of both ventricles. These thrombotic areas extend out into the lumen of the heart; they are smooth and white. No changes are noted in the valves. The root of the aorta shows many raised yellowish areas.

The right lung weighs 700 grams. The pleura is greatly roughened with a fibrinous exudate. Crepitation is much reduced in the middle and lower lobes. Both these lobes are solid in their posterior parts. On section pus is easily expressed from the region of the bronchioles. The smaller bronchi are somewhat dilated. The left lung weighs 480 grams. The posterior part of the lower lobe shows a condition similar to that found in the right lung.

The spleen weighs 205 grams. It is firm in consistency and purple in color. On section the pulp is found to be firm.

The liver weighs 1,860 grams. Its lower border extends 6 cm. below the costal margin in the right midclavicular line and 7 cm. below in the midline. The liver is firm in consistency, and on section the centers of the lobules show extensive darkening. No changes are noted in the gallbladder or gastro-intestinal tract.

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*Pathologist, Dr. B. J. Clawson, Prof. of Pathology, University of Minnesota.

The pancreas appears normal. The vessels do not show extensive arteriosclerosis. No changes are noted in the adrenals.

The right kidney weighs 105 grams; the left 115 grams. The capsules strip with some difficulty and leave surfaces containing many fine pits. On section the cortices show only a slight degree of narrowing. The renal arteries show marked sclerosis, so that the lumina are markedly reduced. Microscopic examination shows in many of the glomeruli a hyalinized condition of the arterioles with marked sclerosis. The mucosa of the bladder is smooth. There is no enlargement of the prostate.

The abdominal aorta shows quite extensive intimal thickening with several ulcerated areas.

The head was not examined.

Diagnosis—

1. Cardiac hypertrophy (hypertension)
2. Coronary sclerosis and thrombosis
3. Mural thrombosis
4. Pleuritis
5. Pericarditis
6. Bronchopneumonia
7. Hydrothorax, hydroperitoneum, edema of scrotum and generalized anasarca
8. Generalized arteriosclerosis
9. Arteriosclerosis of kidneys
10. Multiple skin lesions (pyoderma)
11. Diabetes, clinical

SUMMARY

This patient suffered from diabetes for fourteen years and at the age of thirty-three died from coronary disease with marked arteriosclerosis. His diabetes became less severe the longer he lived. His arteriosclerosis developed very markedly between the first and second periods of hospitalization. Dr. E. P. Joslin has shown that formerly 61 per cent of the fatalities in diabetics were due to coma, but since the introduction of insulin this has decreased to practically zero. Coincidentally arteriosclerosis as the cause of death has risen to 47 per cent. He expresses the thought that diabetics become prematurely old as evidenced by the increased arteriosclerosis. Bowen and Koenig have found in their series of cases arteriosclerosis demonstrable by the roentgenogram in 63 per cent in sixty-two observations in patients beyond the age of 40. At the same time they show that in 121 non-diabetic subjects in a similar age period, 28 per cent showed arteriosclerosis. From their work it appears that the cases of diabetes which have not been under control are more prone to the development of arteriosclerosis. Dr. Raymond Peterson in his study of the postmortem material at the University of Minnesota found that arteriosclerosis is much more pronounced in both severity and frequency in diabetics than in non-diabetics in the same age group. Sclerosis of the aorta was always present in diabetics over fifty years of age. Graded with 4 as the maximum, the largest number of cases falls in grades 3 and 4 in diabetics over 60 years of age; in non-diabetics the same age, the largest number fall in grade 1. Dr. Morris Nathanson studying the same material showed that 54 per cent of the cases with a history of diabetes had coronary disease, while approximately 13 per cent of the diabetics showed coronary disease.

It is interesting to note that the pancreas in this patient appeared normal and that the vessels did not show very extensive arteriosclerosis. Whether or not there was any regeneration during the fourteen years that he suffered from diabetes, it is hard to state, but at least no atrophy was present. His pancreas was within normal limits. What effect the anti-luetic treatment had in producing the marked arteriosclerosis is not known. Some have claimed that the heavy metals used in anti-luetic treatment predispose them to premature arteriosclerosis.

CONCLUSIONS

1. This case demonstrates how difficult it is to determine the relationship between diseases of metabolism and diseases of the degenerative type.
2. It does not seem necessary to assume that syphilis played a very important part in this case.
3. I present this as a case of juvenile arteriosclerosis, realizing that the relationship between diabetes and arteriosclerosis has not been determined. The diabetes, arteriosclerosis and syphilis might have contributed factors causing the untimely death of this patient.

BIBLIOGRAPHY

1. Bowen and Koenig: Bulletin of the Buffalo Gen. Hosp., Vol. V, No. 2, 1927.
2. Joslin, E. P.: Treatment of diabetes mellitus, 4th Ed., Sec. 10.
3. MacCallum, W. G.: Arteriosclerosis, Physiol. Rev. 2: (Jan.) 1922.
4. Nathanson, Morris. To be published.
5. Peterson, Raymond: Thesis for M. A., June, 1927. University of Minnesota, Dept. of Pathology.

CARDIAC DECOMPENSATION AND ITS TREATMENT*

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THERE is no disease today which has so large a morbidity and which results in so great a mortality as heart disease. It is the most important problem confronting the medical profession and touches practically every field of medicine. The prevalence of this disease and the mortality resulting from it are indicated by the fact that according to conservative estimates 2 per cent of the total population of the United States are seriously affected by it, and that it contributes 15 per cent of the total number of deaths from all causes. Charts I, II, and III reveal the significant fact that the heart death rate curve far exceeds all other rate curves, and that the rate is progressively rising.

The term heart disease is an inclusive term which covers any abnormal condition of the heart from the time the organ first reacts to an injurious agent or condition. In the earlier stages this is entirely without symptoms and may be also without signs. When, however, the pathological process has progressed to the point where the organ is unable to maintain an adequate circulation of the blood during the usual exertion and activities, thus producing certain sensations of distress or discomfort in the patient, we term such a condition heart failure. This inability to maintain an adequate circulation results in a disturbed blood distribution: A deficiency on the arterial side, and, what is even more important, a concomitant excess on the venous side. All the signs and symptoms which the patient presents—dyspnea, cyanosis, orthopnea, a painful and engorged liver, tachycardia, edema, ascites—are simply the result of an accumulation of blood under increased pressure on the venous side and at the same time a corresponding depletion in the arterial system. This concept of a disturbed blood distribution with an increased venous pressure as being the essential factor in heart failure cannot be emphasized too strongly. That is what congestive heart failure signifies. There is one exception to this definition, and that is the angina syndrome of the so-called angina pectoris where the patient dies suddenly from ventricular fibrillation without any signs of congestive failure. The anginal syndrome is thought to be principally the result of anoxemia of portions of the heart musculature caused by coronary disease (sclerosis, thrombosis) together with coronary spasm. Due to the blood deficiency and consequent lack of oxygen there is incomplete oxidation of metabolic products, resulting in an accumulation of lactic acid. When the acidity reaches a certain degree of hydrogen ion concentration, fibrillation sets in.

When the condition has further advanced to the point where the heart is unable to efficiently propel the blood through the vascular system except when the patient is restrained from doing any kind of work whatsoever, we designate such a condition as cardiac decompensation. This condition later progresses to the state when the above mentioned symptoms and findings are present even when the patient is confined to his bed at complete rest.

To summarize, these are the three stages of heart disease: First, when the affection is early and usually unrevealed; second, when the condition becomes apparent through various clinical manifestations brought on by strain or excessive exertion, such a condition being termed heart failure; and thirdly, when the signs and symptoms are present though the patient is restrained in his exertions or even at complete rest. This third stage is designated as cardiac decompensation.

PHYSIOLOGICAL PROPERTIES OF HEART MUSCLE

In order to properly understand heart disease and its sequences it might be well to recall the five intrinsic properties of heart muscle so well described by Gaskell and Engelmann. These are: stimulus production, rhythmicity; stimulus conduction; excitability; contractility; tonicity.

By *stimulus production* we mean that a stimulus material (hormone?), a chemical compound recently isolated by Haberlandt,[3] is continuously manufactured normally in the sinus node which regulates the rhythm activity of the heart. The

*Presented before the Minnesota State Medical Association, St. Paul, Minnesota, May 14, 1929.

CHART I

DEATH RATES PER 100,000 FROM SEVEN PRINCIPAL CAUSES OF DEATH
NEW YORK STATE EXCLUSIVE OF NEW YORK CITY, 1918-1926

Cause of Death	1926	1925	1924	1923	1922	1921	1920	1919	1918
Diseases of the Heart	303	273	261	270	260	234	243	221	247
Cerebral Hemorrhage	126	120	131	128	132	128	127	123	126
Cancer	121	121	120	117	115	114	109	106	104
Nephritis	121	118	112	111	111	110	117	116	128
Pneumonia	117	98	92	115	109	85	138	129	293
Accidents	86	89	88	90	82	76	78	76	88
Tuberculosis	85	89	91	95	95	99	112	126	145

sinus node is thus known as the pace-maker. Other regions of the heart have also the property of producing this stimulus material but to a much less degree. The formation of this material may be heightened or depressed by certain nervous influences and also by the amount and character of the blood supply.

Conductivity is the property of the heart muscle which makes it capable of transmitting stimuli from muscle cell to muscle cell. Conductivity can be heightened and depressed by nervous influences and by certain physical and chemical agents.

Excitability is that property of the cardiac muscle by virtue of which it responds to stimuli. It is measured not by the intensity of the action resulting from a stimulus but by the strength of the stimulus necessary to produce the contraction. Nervous and nutritional influences may increase and decrease excitability.

Contractility is the property by virtue of which the muscle cells become shortened, which is an important factor in emptying the heart chambers of their contents. Contractions of the heart muscles are always maximal. Contractility is measured by the degree of its contraction.

Tonus is that property of the heart muscle which enables the heart wall to resist stretching during diastole. This property maintains the efficiency of the heart by resisting over-filling of the chambers and by promoting a natural tension which is conducive to an effective contraction.

PATHOLOGIC PHYSIOLOGY

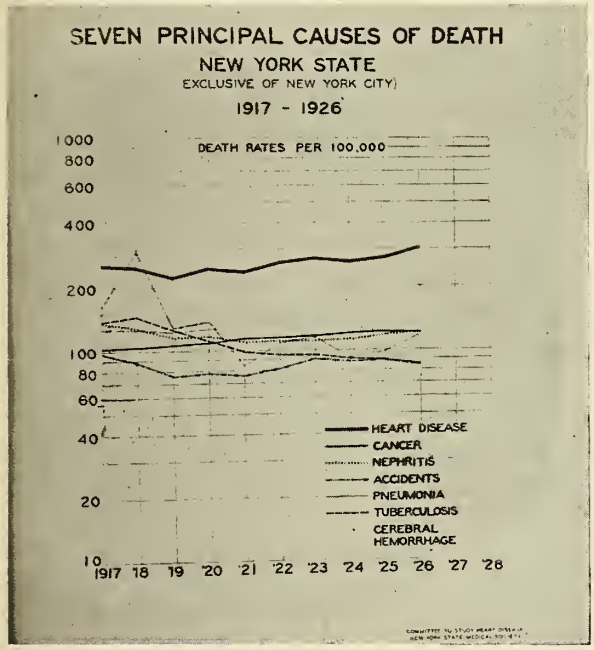
Disturbances of some of these properties of the cardiac muscle occur in practically all forms of heart failure, for in all affections of the heart, valvular, muscular or rhythmic, the condition of the muscles has to be taken into account. And it is important to bear in mind that in considering heart disease we are altogether too prone to stress the anatomic lesions, either gross or microscopic, and overlook the importance of certain physico-chemical changes in the muscles which though not demonstrable anatomically may result in muscular exhaustion and fatigue and may lead to a progressive impairment in function. Take as an example the myxedema heart, which is caused by some functional loss of muscle tone as a result of thyroid deficiency. This heart may enlarge, decompensate and proceed on a downward course until appropriate thyroid treatment has been instituted. Through such treatment there is usually a most remarkable recovery. Not only do the symptoms of decompensation disappear but the cardiac outline decreases and often recedes to normal proportions. Such a result is possible only in cases of functional disturbances and never where organic changes such as fibrosis and true hypertrophy are involved.

Disturbances of the last two properties of the heart muscle, contractility and tonicity, mentioned above, affect the functional capacity of the heart and may lead to cardiac enlargement and heart failure. Tonicity is the property which maintains the muscles in a state of static contraction, the impairment of which results in dilatation and also in hypertrophy. In this condition the heart does not empty itself completely during systole so that there remains a gradually increasing amount of residual blood. In the effort to compensate, the muscles finally are exhausted from overwork.

Disturbances of the other important property, contractility, are brought about chiefly by impoverishment of the circulation as in coronary disease. Broadbent[1] believes that angina pectoris is a result of a depressed contractility, and that pulsus alternans is a characteristic sign of

this, while precordial pain is a characteristic symptom. Precordial pain on exertion is a cardio-sensory reflex warning, he believes, signifying that the heart has reached the limit of its capacity and can no longer cope with the increased demand. These two factors just described, loss of tonus and depressed contractility, are the most important ones involved in myocardial heart disease. They are also more or less important in the other forms of heart failure.

CHART II

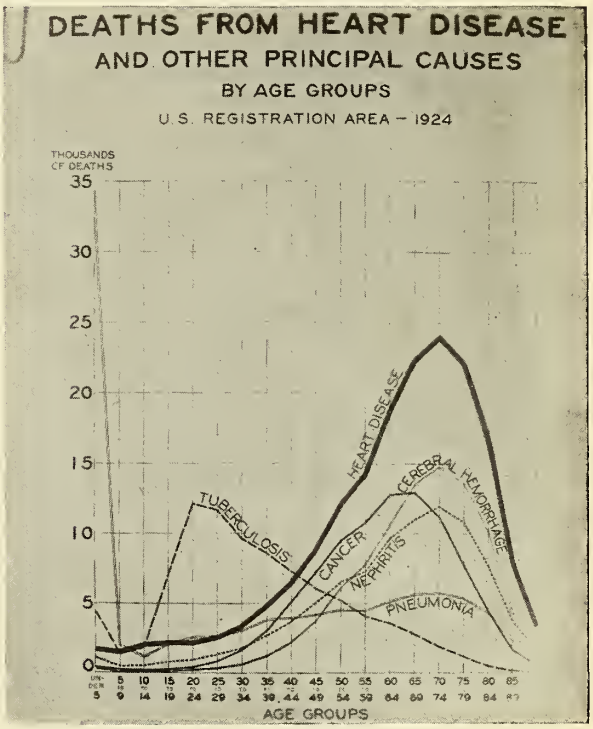


TYPES OF HEART DISEASE

According to Chart IV it will be seen that the efficiency of the heart may be impaired by three main types of lesions acting singly but often in combination, which may ultimately lead to cardiac failure: (1) Damage to the muscle; (2) disturbances of the valves; and (3) disorders of the rhythm.

Myocardial disease.—This type contributes by far the greatest number of cases of heart failure, variously estimated from 65 to 77 per cent. This class is composed principally of hypertensive cardiovascular disease and includes practically all types of heart disease free from valvular involvement. Chart IV, Group 1, shows in detail the different types of heart disease that go to make up this group. As already stated, essential hypertension and coronary disease furnish by far the greatest number of cases, the remainder being furnished by syphilis, goiter, toxic states and myocarditis. Myocardial heart disease is most often incorrectly diagnosed as chronic myocarditis, a condition which pathologically is extremely rare. The classification suggested in Chart IV is of value since it attempts to unite the underlying pathological conditions with the various types encountered clinically. From 80 to 95 per cent of this group occur in individuals over 50 years of age. Chart X shows the relative frequency of the different types of heart disease.

CHART III



There is still some doubt in the minds of many as to the occurrence of heart failure through hyperthyroidism in otherwise normal hearts. Studies of the literature reveal the fact that careful pathological investigations have been made on patients dying from cardiac decompensation associated with hyperthryoidism and that many of these cases show gross and microscopic evidence of acute myocardial damage. Thacker[4] reviews the literature on the subject and concludes that from 2 to 6 per cent of cases of hyperthyroidism present severe cardiac damage brought about in approximately the following manner: increased metabolism increases the car-

CHART IV

Classification of Heart Disease

I. *Myocardial*
- A. Acute exudative myocarditis
  1. Abscesses
  2. Infected mural thrombi
  3. Extension from pericarditis
- B. Toxic myocardium
  1. Mild, in mild infectious processes
  2. Severe, in severe infectious processes, as diphtheria
- C. Chronic myocarditis—syphilitic myocarditis (Warthin) rare
- D. Chronic adhesive pericarditis, usually with adhesive mediastinitis
- E. Hypertension heart
  1. Without coronary disease
  2. With coronary disease
  3. Secondary to chronic glomerulo-nephritis
- F. Coronary disease; with or without hypertension
  1. With hypertrophy
     a. Without congestive failure
     b. With congestive failure
  2. Without hypertrophy
     a. Without congestive failure
     b. With congestive failure
- G. Thyroid heart
  1. Hyperthyroidism
  2. Myxedema heart
- H. Right heart failure; chronic emphysema, adhesive pleuritis, pulmonary fibrosis, Ayerza's disease.

II. *Valvular*
- A. Endocarditis—principally mitral and aortic
  1. Rheumatic
     a. Acute
     b. Recurrent
     c. Chronic old valve defect
     d. Pancarditis, mostly rheumatic, with endocarditis and pericarditis
  2. Bacterial
     a. Acute—primary, secondary
     b. Subacute (Libman)
        (1) Primary on normal leaflets
        (2) Superimposed on old valve defects
- B. Chronic valvular disease, non-rheumatic
  1. Congenital heart disease, principally pulmonary lesions with or without other heart anomalies
  2. Atherosclerosis, degenerative, senile
- C. Syphilitic, aortic

III. *Disorders of Rhythm*—Infrequent as primary cause of heart failure
- A. Auricular fibrillation (and flutter)
  1. Primary, paroxsymal
  2. Secondary
     a. Mitral stenosis
     b. Hypertension heart
     c. Hyperthyroid heart
     d. Other conditions
- B. Paroxysmal Tachycardia
  1. Auricular
  2. Nodal
  3. Ventricular
- C. Heart Block
  1. Partial
  2. Complete—with or without Stokes-Adams syndrome, usually secondary to coronary disease and myocardial fibrosis

CHART V

Principal Causes of Cardiac Deaths

1. Hypertension heart
2. Valvular disease
3. Coronary disease—anginal syndrome
4. Syphilis of heart and aorta
5. Pericarditis, pancarditis
6. Congenital heart disease
7. Myocarditis, acute and chronic
8. Right heart failure, from intrapulmonary lesions
9. Thyroid heart—hyperthyroidism, hypothyroidism
10. Disorders of rhythm

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diac work, stimulation of the sympathetics also increases the heart rate, and the thyroid secretion has a direct toxic effect on the heart muscle, leading to degenerative lesions. The combined effect results in fatigue and dilatation and hypertrophy through the loss of muscular tone. Later disturbances of rhythm, usually auricular fibrillation, may set in and all the factors together may lead to progressive dilatation and hypertrophy and finally to congestive heart failure. Both mechanical and toxic factors therefore. come into play in bringing about the final outcome. A previously damaged heart of course would hasten the onset of circulatory insufficiency.

Valvular disease.—Valvular lesions impair the mechanical efficiency of the heart as a pump, thus increasing its work. However, the true functional capacity of the heart, being dependent on the integrity of the muscles, may remain unimpaired. The greatest etiological factor in valvular disease is rheumatic fever, which occurs most frequently between the ages of 15 and 25. After the age of thirty acute rheumatic fever is relatively infrequent. This lesion most frequently involves the mitral leaflets, which are affected to a greater or lesser degree in about 75 per cent of cases of rheumatic endocarditis. The most common lesion is mitral stenosis and regurgitation. The occurrence of a pure mitral insufficiency is extremely rare. The aortic leaflets are next in frequency of involvement, while lesions of the tricuspids and pulmonary valves are very rare. In older people sclerosis of the aorta and at times of the mitral valves are encountered, which may be either calcification of previously damaged valves resulting from rheumatic fever or less frequently may be a simple senile atherosclerotic process.

In the group of valvular diseases is included also aortic regurgitation associated with meso-

aortitis luetica. This lesion is eight times more frequent in males than in females. The characteristic feature of this lesion is that it produces a pure aortic insufficiency which is a result of dilatation of the aortic ring weakened by the syphilitic degeneration of the media. Very rarely is there any stenosis present. When this occurs it is the result of synechiæ of the cusps.

Valvular heart disease is much less frequent than is generally supposed. According to Cabot it comprises only 23 per cent of all causes of heart disease. To the laity and to many physicians as well, the term heart disease connotes valvular heart disease, which of course is a gross error. The mitral systolic murmur at the apex which is so often a relative murmur and the so-called functional pulmonic systolic murmur are largely responsible for the excessive number of clinical diagnoses of mitral regurgitation. The importance of properly evaluating cardiac murmurs is far from being academic. Too many patients with utterly unimportant cardiac murmurs in otherwise normal hearts are made temporary or often confirmed semi-invalids through some casual remark from a doctor that he has found a leaky valve. No amount of reassurance by one or many doctors can eradicate the feeling of invalidism so inculcated in an impressionable neurotic individual. This is especially true if the patient has some member of his family suffering from true heart disease. One must be very careful lest a patient leave the office in a worse condition mentally than when he enters.

Disorders of rhythm.—As a primary cause of heart disease this group is relatively unimportant. The disorders of rhythm are brought about by disturbances, functional or organic, in the first three of the five above named properties of cardiac muscle, stimulus production, stimulus conduction and muscular excitability. Auricular fibrillation is the commonest form of arrhythmia and is most often secondary to chronic mitral stenosis, hypertension and hyperthyroidism. Paroxysmal tachycardia, auricular flutter and heart block occur much less frequently. Heart block results from disturbances in conductivity, and the most severe form may lead to Stokes-Adams syndrome. Extra systoles, both ventricular and the less common auricular, do not come under this discussion, since these never lead to any serious symptoms.

CARDIAC ENLARGEMENT

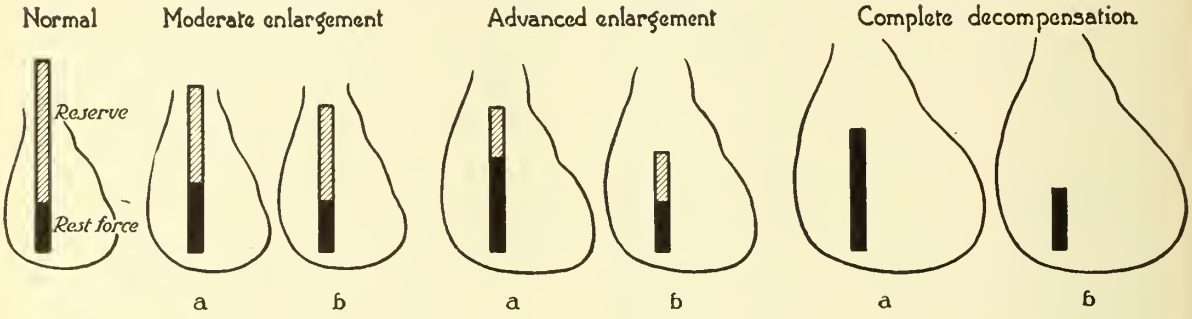
The most important criterion for establishing the presence of heart disease is cardiac enlargement. As will be seen later, there may be occasional cases of severe heart disease, even to the point of congestive failure, with no increase in cardiac outline, but such cases are rare. The cardiac outline as obtained through careful physical examination and checked by a roentgenogram is therefore extremely important in cardiac diagnosis. The shape as well as the size of the heart helps in determining within certain limits how far a given heart has progressed toward decompensation. For every heart, as soon as it shows definite signs of enlargement, has started down the path towards heart failure.

To thoroughly understand this fact, one must remember that the normal heart does not perceptibly increase in size no matter how great the demand placed upon it. This fact has been well established in various countries through careful studies on marathon runners and other athletes. In a recent study[2] of twenty-three long distance runners at the end of a race from Los Angeles to New York it was found that the hearts were actually smaller in thirteen, normal in five, and showed slight enlargement in five, in only one of which there was an increase above the average in the cardiothoracic ratio. The heart of a trained athlete may show some increase in weight through pure hypertrophy but this increases the cardiac shadow only by a few millimeters. It is only when the heart dilates that the cardiac outline shows definite enlargement. And a dilated heart is always a pathological heart. The normal heart responds to increased demands by an increase in the minute volume output brought about by an increased venous return of the blood which raises the venous pressure, filling the ventricle more fully and causing better and more complete systolic contraction. The systolic output is thus increased, which together with the increased pulse rate may raise the heart output from 4.5 liters per minute to as high as 14 liters. The upper range in this increased work is known as the limit of cardiac reserve.

When the venous pressure on the ventricle exceeds the physiological limit of the muscle, the muscle stretches and the contraction becomes weaker and less efficient. This happens when the heart has been altered through disease pro-

cesses. The over-stretching of the muscle gradually leads to permanent enlargement, chiefly dilatation. In a general way, lesions of the valves produce cardiac enlargements which differ somewhat from those secondary to hypertensive states in that there is less hypertrophy present.

CHART VI



a. Hypertension b. Other diseases

This diagram shows schematically the gradual cardiac enlargement resulting from heart disease. The total heart force is represented by the combined rest force and reserve force. In the hypertension heart (a), the total heart force is reduced proportionately less than in the other types but the cardiac reserve is no greater. This is due to the increased work of the heart with the patient at rest using up the cardiac reserve caused by the increased blood pressure. The diagram attempts to emphasize the fact that with the increase in the heart silhouette there is a corresponding decrease in the cardiac reserve. The last two views show very large hearts where the cardiac reserve has been entirely used up. Patients with hearts in this stage are bedridden in a state of complete decompensation.

It is thus seen that the presence of cardiac dilatation and hypertrophy signify that the reserve forces of the heart are being brought into play and it might be stated in general terms that the increase in cardiac outline develops at the expense of cardiac reserve. An enlarged heart is on the road to heart failure and the larger the heart the nearer it is to decompensation. Chart VI illustrates this idea. The normal heart may be considered to possess a heart force consisting of a small rest force and a large reserve force. As soon as the heart is unable to maintain an adequate circulation of blood without enlargement it starts drawing on its reserve force. This reserve force may be depleted in two ways, by a diminution of the total cardiac force or by an increase in the rest force. Often both factors are present. In essential hypertension the reserve force is spent even while the patient is at rest, because of the great increase in work due to the increased blood pressure. The total cardiac force is reduced relatively less than in valvular disease since there is a greater element of hypertrophy present. As the process goes on and the heart becomes very large the reserve force may be all used up and complete decompensation ensues. The size the heart must reach before the cardiac reserve is expended and the condition of decompensation sets in, naturally varies with different individuals and unfortunately no measurements or set formulæ can be stated to indicate the degree of loss of cardiac reserve present at any given time.

When the cardiac outline is found to be within normal limits one should be slow in making a diagnosis of serious heart disease, even though murmurs and suggestive symptoms may be present. The only exceptions to this rule are cases with anginal syndrome and cases with acute infections of the heart or advanced states of malnutrition when cardiac weakness and even decompensation may be present in hearts that show little or no increase in size. These cases, however, are not common. Chart VII shows some of the common errors in cardiac diagnosis as revealed by careful postmortem studies. In mortality statistics nephritis ranks high, occupying from second to fifth place among the principal causes of death. I believe that the frequency of nephritis is greatly exaggerated because many cases of cardiac decompensation associated with edema and albuminuria secondary to essential hypertension are being diagnosed as nephritis. A correction of this error would greatly lower the nephritis death rate and proportionately increase the death rate from heart disease.

CHART VII

Common Clinical Diagnoses (according to Dr. E. T. Bell)	Pathological Findings
1. *Chronic Myocarditis*	Hypertension Coronary sclerosis Old valve defect Adherent pericardium Toxic myocardium
2. *Mitral Regurgitation*	Hypertension Bacterial endocarditis Old valve defect Adherent pericardium Toxic myocardium Coronary sclerosis (congestive type)
3. *Aortic Regurgitation*	Bacterial endocarditis Old valve defect Luetic aortitis Hypertension
4. *Chronic Interstitial Nephritis*	Hypertension heart with congestive failure, edema and albuminuria Malignant hypertension

CRITERIA FOR DIFFERENTIAL DIAGNOSIS

There are certain criteria which may help greatly in the differential diagnosis of the various types of heart disease and these may be tabulated as follows.

I. Acute valvular disease, endocarditis
   1. fever (chills)
   2. leukocytosis
   3. toxemia
   4. rheumatic pains, signs of acute arthritis
   5. development of murmurs

In subacute bacterial endocarditis the following may be present in addition to the above:

   6. petechiæ and other embolic phenomena
   7. positive blood cultures
   8. enlarged spleen
   9. red blood cells in the urine
   10. anemia

Death may be due to toxemia, embolic accident or congestive heart failure.

II. Chronic endocarditis, chronic valvular defect
   1. history of previous attacks of rheumatic fever, tonsillitis, chorea
   2. enlarged and altered cardiac outline
   3. murmurs, the character depending on the type of valvular lesions, diastolic murmurs being the more important
   4. for mitral stenosis without fibrillation the presystolic murmur is important
   5. for aortic stenosis a palpable systolic thrill is important
   6. alterations in character of pulse
   7. auricular fibrillation especially in mitral stenosis
   8. anginal attacks in aortic lesions
   9. cardiac asthma principally in aortic lesions

Death occurs principally from congestive failure, acute endocarditis being occasionally superimposed. Mitral lesions may result in repeated attacks of decompensation followed by compensation, ability to compensate being good. Aortic lesions, when once decompensation occurs, show a very poor tendency to compensation.

III. Toxic myocardium
   1. follows acute infections, diphtheria, influenza
   2. electrocardiograph may show charteristic changes
   3. tachycardia on slight exertion
   4. complete restitution in practically all cases

IV. Thyroid heart
   A. Hyperthyroid heart
      1. symptoms of hyperthyroidism
      2. increased metabolic rate
      3. tachycardia

4. auricular fibrillation
5. symptoms of congestive failure
6. pulsus alternans, serious
7. treatment of thyroid condition often results in cure

B. Myxedema heart
1. symptoms of myxedema
2. low basal metabolic rate
3. generalized enlargement of the heart
4. symptoms of congestive heart failure
5. thyroid extract restores condition to normal, functionally and anatomically

V. Hypertension heart
1. generally in individuals past 40 years of age
2. blood pressure high, may be low
3. moderate to marked cardiac enlargement, aortic in type
4. retinal changes
5. often familial history
6. altered heart tones especially when associated with coronary disease
7. precordial distress, anginal attacks
8. cardiac asthma, nocturnal dyspnea
9. auricular fibrillation
10. cerebral accidents, apoplexy in about 20 per cent
11. mitral systolic murmurs, relative in origin
12. aortic diastolic murmur, very rare
13. if decompensated, poor comeback, only slightly better than aortic valvular disease
14. uremic death from arteriolar sclerosis of the kidneys in about 8 per cent of cases

VI. Coronary disease
1. age usually over 50, may be as early as 30
2. anginal syndrome common; crowding, retrosternal and precordial pressure pain with or without radiation
3. electrocardiogram frequently characteristic
4. mild diabetes, often
5. altered muffled heart tones
6. may be with or without hypertension
7. with or without enlargement
8. with or without congestive failure
9. long-continued pain generally signifies coronary thrombosis, serious
10. paroxysmal dyspnea and cardiac asthma
11. arrhythmias
12. death may be sudden from ventricular fibrillation

VII. Syphilitic cardiovascular disease
1. history of lues
2. usually above age of 40
3. Wassermann positive in about 70 per per cent
4. pure aortic regurgitation
5. dilatation of aorta, evidence of mesoaortitis luetica
6. aneurysm, frequently
7. anginal syndrome, principally from closure of ostia of coronaries
8. congestive heart failure

VIII. Congenital heart disease
1. cyanosis from infancy
2. clubbed fingers
3. atypical murmurs at base
4. polycythemia
5. other congenital deformities

IX. Disorders of rhythm, primary
1. irregularities in pulse
2. abnormal electrocardiograms
3. prognosis generally good
4. termination of a few in congestive heart failure

CLINICAL EVIDENCES OF HEART FAILURE

The clinical evidences of heart failure are usually definite enough so that a correct diagnosis can be made by most physicians who are careful in the examination of the patient. An important fact to bear in mind is that the stethoscope gives practically no information about compensation or decompensation and one should therefore not diagnose with the stethoscope. A careful history is most essential in obtaining information relative to the ability of the heart to do work under different degrees of strain, since one is entirely dependent on the history for the subjective sensations so important in cardiac diagnosis. In the early stages some of the symptoms such as palpitation, undue shortness of breath, precordial pain, substernal crowding, fatigue, may follow

only violent exertion or exhaustion. Later, as the reserve force gradually diminishes, these same symptoms may be present after less strenuous effort. Pain, breathlessness and undue fatigue, together with symptoms referable to the stomach, are often early indications of a failing heart. As the condition progresses, dyspnea increases, there develops cyanosis, râles in the bases of the lungs, the liver becomes large and tender, and there may develop edema of the legs, ascites, hydrothorax, oliguria, paroxysmal dyspnea, tachycardia, cardiac asthma. The enlarged distended cervical veins show the increase in the venous pressure. In severe cases there may develop frothy blood-stained sputum signifying edema of the lungs, especially in mitral disease. A sudden onset of coughing with expectoration of bloody sputum often suggests pulmonary infarction, the embolus originating in a thrombus in the right auricle. Other sudden embolic phenomena such as hemiplegia, splenic infarct, kidney infarct (hematuria) are manifestations of emboli from left auricular thrombosis. Thromboses in the auricles signify either cardiac decompensation or auricular fibrillation. Thrombosis in the ventricles is quite rare and when it occurs is associated with advanced myocardial degeneration and fibrosis from coronary disease.

A low systolic blood pressure together with a low pulse pressure is a definite sign of a failing heart. Vital capacity is of value as a quantitative measure of the degree of heart failure. It rarely gives any evidence of cardiac insufficiency which cannot be estimated by other methods of investigation. The electrocardiograph often shows evidence of myocardial damage that cannot be estimated in any other way. This is especially true in cases of severe coronary disease, and in coronary thrombosis. The roentgenogram is a very valuable aid in cardiac diagnosis because it gives an accurate silhouette of the heart both as to shape and size and thus furnishes very reliable evidence of cardiac disease. The evidence of decompensation lies principally outside of the heart itself, as a result of increased venous pressure which is manifested in the signs and symptoms of passive congestion. A markedly enlarged heart signifies that the heart has used much, if not most, of its reserve force and that the outlook is not too favorable. If not much enlarged the heart may still have considerable reserve force. Gallop rhythm and pulsus alternans are very grave signs of heart failure and are evidences of serious myocardial damage.

CHART VIII

DEATH RATES FOR HEART DISEASE AND OTHER PRINCIPAL CAUSES OF DEATH, MINNESOTA DEPARTMENT OF HEALTH, GERDA C. PIERSON, DIRECTOR, 1928

Causes	Death Rates per 100,000
Heart Disease	150.70
Cancer	106.40
Pneumonia	66.09
Nephritis	53.78
Tuberculosis (all forms)	53.60
Influenza	39.79
Diabetes	18.81

(To Be Concluded in September)

Editor's Note.—Owing to the extensiveness of this paper it has been divided into two sections. Part II, taking up the matter of treatment, will appear in our next issue.

CASE REPORTS

SYPHILIS OF THE STOMACH*

REPORT OF CASE

J. A. Johnson, M.D.
Minneapolis

The patient, Mr. L. J., fifty-four years of age, came to the clinic on January 23, 1922, and gave the following history: He had been well until four years previous, when he began to complain of indefinite stomach trouble such as indigestion, belching of gas, and eructation of sour material. Three years previous he was taken with severe cramps after a heavy meal and for the first time vomited. Following this attack he gradually grew worse and for the past few months he had been able to hold practically nothing on his stomach. His weight two years previous was 145 pounds and at the time of examination was 112 pounds.

X-ray of his stomach showed almost complete obstruction at the lower third. There was a large palpable mass over the stomach area. The urine was normal. There was a slight trace of blood in the stool. No free HCl was found in stomach contents. The hemoglobin was 70 per cent, R.B.C. 3,900,000, Wassermann 4 plus.

Neurological examination was negative except that there was slight irregularity of his pupils. He had had his initial lesion nineteen years before. He had been well treated over a period of several years, both by internal and external medication.

We were unable to make a definite differential diagnosis in this case and because of his extreme emaciation felt that an exploratory was justified. He was operated in February, 1922, with the following findings: The stomach wall was about three times the normal thickness. There were gray striations, especially over the fundus of the stomach, which much resembled a linitis plastica or the so-called leather-bottle stomach. The hypertrophy was uniform, being, however, a little more marked at the pylorus. The stomach was carefully palpated anteriorly and posteriorly and there was no evidence of any localized area of infiltration. There were adhesions extending from the duodenum to the liver and this evidently had considerable to do with his obstruction. There was only one enlarged gland present at the pyloric end. The rest of the abdomen was normal. Posterior gastro-enterostomy was done and at the same time a large portion of all the layers of the stomach was removed for microscopic examination. A pathological report from Dr. Bell at the University of Minnesota stated that he was unable to find any evidence of malignancy in the stomach or gland. There was very extensive atrophy of the mucosa. The submucosa and muscular coats were very much hypertrophied. He stated further that this was quite a typical picture of what occurs in syphilis of the stomach. The postoperative convalescence was entirely normal. I saw him on November 28, 1925, at my office, three years after the operation. He said that he had had absolutely no trouble since. He received antiluetic treatment from his family physician for a couple of years. I saw his family physician in December, 1928, and he told me the man had been in splendid health ever since.

*Presented before the Minneapolis Surgical Society, March 7, 1929.

SYPHILIS OF THE STOMACH*

REPORT OF CASE

James M. Hayes, M.D.
Minneapolis

Formerly, syphilis of the stomach was considered rare. Recent improved diagnostic methods, *x*-rays, serology, etc., have brought out the fact that it is not so rare. It has recently been estimated that it occurs once in about three hundred gastric lesions.

In 1905 Chiari gave the first classical description of this condition from post-mortem examination. Myers in 1912 reported fifty-eight cases from the literature. Smithies reported twenty-six clinical cases in 1915. In 1917 Eusterman reported twenty-three clinical cases. Downes, in 1917, reported eight clinical cases.

From these and other exhaustive studies the following definite facts have been brought out:

1. The condition may occur in congenital or acquired syphilis.
2. Gastric symptoms appear from four to twenty-five years after the initial lesion.
3. Duration of symptoms averages about eight years.
4. These are usually dyspeptic symptoms simulating cholecystitis, duodenal or gastric ulcer.
5. Pain is usually severe immediately after meals—frequently a cutting pain, worse at night.
6. Usually anacidity or achylia, probably due to destruction of mucosa, is present.
7. Pain is frequently relieved by alkalies, but not by food.
8. Marked weight loss may occur, without corresponding cachexia.
9. Marked deformity of the stomach occurs when symptoms become pronounced.
10. Usually a marked sclerosis develops in the mid-portion of the stomach, giving an hour-glass or dumb-bell deformity.

*Presented before the Minneapolis Surgical Society, March 7, 1929.

11. A palpable mass or six hour residue is frequently not present.

12. There is not a steady and continuous progress to fatal termination as in cancer of stomach.

13. Under specific treatment, symptoms usually clear up but the deformity remains.

CASE REPORT

A married woman aged 31 could give no history of a primary lesion. Her family history and previous personal history were negative.

In 1920 she first had severe attacks of epigastric distress which came on in the night. Some form of medication by mouth gave her relief, and she had no more marked symptoms until 1923. Then she had a sudden severe attack of epigastric pain with symptoms of perforation of an abdominal viscus. She was taken to the General Hospital, the abdomen opened and a gastric perforation closed. Following the operation she had epigastric distress and digestive symptoms, but no severe pain.

The patient was married in 1924 and gave birth to a healthy, normal child.

In 1926 she had a sudden, very severe epigastric pain which came on after eating. She was relieved for a short time by a hypo of morphine, but attacks recurred frequently. She was taken to the hospital and *x*-ray of the stomach showed a typical and extensive dumbbell deformity. The patient did not appear older than her age, and there was no marked cachexia. There was no six hour residue nor palpable mass. The blood showed a four plus Wassermann reaction. The patient was put on specific treatment and the symptoms disappeared. She had very little difficulty during the following two years.

About one year ago, April 4, 1928, the patient had a sudden, severe, gastric hemorrhage. She was brought to the hospital and transfused. The hemorrhage recurred. Transfusion was repeated four times but the hemorrhage continued and surgery was resorted to. Almost the entire anterior gastric wall had become adherent to the abdominal wall and there was a large ragged ulcer perforating posteriorly into the pancreas. The gastric wall for some distance from the ulcer resembled, in consistency, the so-called "leather bottle" stomach. The ulcer was excised together with a large part of the lower gastric wall, a high gastro-enterostomy was done and the wound closed without drainage.

The patient made a smooth recovery and has had practically no trouble since. *X*-ray of the stomach now appears almost normal.

President's Letter

AUGUST, the real vacation month, is just in the foreground. The busy, hardworking doctor owes it to himself, his family and his patients to take a rest and occupy his mind, as well as his body, with interests that are quite foreign to his daily duties. To get away and find solace and surcease in the great outdoors is the panacea for some of us. Others will visit distant cities to observe the activities of men engaged in pursuits similar to our own and to refresh and replenish our store of knowledge as to the progress and development of things ever new. To each in his own way the results of a vacation are shown in an added zest for better things to follow, a deeper insight into human nature, a desire to help and give comfort, to instil courage into weary and discouraged minds and bodies, and to start again that wish to achieve and accomplish, temporarily lost or abandoned.

For those who long to get away from the haunts of men and bask in the sunshine of the wilderness Minnesota offers opportunity unlimited.

August is to be noted as a month fraught with much of interest and value to the profession of medicine. In August, 1897, Sir Donald Ross first announced his far reaching discovery of the fact that the dapple-winged mosquito was the carrier of malaria. In August, 1904, General Gorgas began his epoch-making assault on the mosquitoes of the canal zone, making this area a safe place for the white man to live, basing his activities upon Sir Donald's researches, and this other species of mosquito responsible for the spread of yellow fever was virtually exterminated and instead of a death rate of seventy-five per cent of the workers who labored in the canal zone for nine years under the French, the death rate was reduced to almost zero from this scourge. In August, 1914, just seventeen years later, the canal was completed and opened for shipping. It is interesting to note that in August, 1774, Priestly, a famous chemist of his time, discovered oxygen. He called it pure air from the fact that when inhaled it produced a feeling of exhilaration and vastly increased the vigor and volume of a candle flame.

Whatever we do or wherever we spend our vacation days let us ever keep in mind that we are attempting to store up surplus energy to carry us through the trying days ahead.

President,
Minnesota State Medical Association.

EDITORIAL

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THE *X*-RAY FILM HAZARD

Although some two months have passed since the tragedy in the Cleveland Clinic, very little locally has been accomplished in a constructive way to prevent the recurrence of a similar tragedy. While for the most part the storage of *x*-ray films in comparatively large quantities is being carried out in this locality in conformity with the regulations specified by the Fire Underwriters, there are exceptions. It is said that at the Crile Clinic these specifications had been complied with, which indicates the need for their revision.

A perusal of the report on the Cleveland Clinic fire by the National Board of Fire Underwriters and the Ohio Inspection Bureau shows that the real cause of the fire will never be definitely known. There was a leak in a steam pipe in close proximity to several tons of stored *x*-ray films which conceivedly might have heated some films to the point of decomposition. According to the report the more generally accepted cause of the fire was the heat from an incandescent lamp in the storage room, and the possibility of a cigarette having started the fire is to be considered. The basement position of the room with the easy access of gases to the air shafts leading to all parts of the building was a particularly unfortunate setting which made the outcome so tragic.

The early rumors that the deadly fumes were from a source other than the films were disproven. The exact nature of the gases is not known. The elements carbon, hydrogen, nitrogen, and oxygen were contained in the films and the report estimates that the poisonous gases probably consisted of about 30 per cent carbon monoxid and about 30 per cent nitrogen peroxid, which is also very poisonous, exerting a corrosive action on human tissues. Hydrogen was probably present and the explosions doubtless resulted from the various gases being heated above their ignition point so that they flashed on contact with air.

The fire hazard of *x*-ray films has long been known. Certain precautions have been specified by fire underwriters, and various municipalities —Minneapolis, for instance—have stringent rules for storage of *x*-ray films. Some municipalities have had no special regulations to cover *x*-ray film storage and to date have adopted no satisfactory regulations. It is true that as a fire hazard *x*-ray films stored in small quantities may not be so great. There was evidence, however, in the Cleveland Clinic building that the gases evolved produced a hot flame. With their explosive possibilities and the danger of evolving lethal gases, their menace to human life is great. Possibly life insurance companies

will have to be depended upon to procure proper action.

The report mentioned proposes two reasonable methods of assuring proper safeguards in the storage of films. One is the compulsory substitution of a type of film which does not possess the dangerous qualities of the nitrocellulose film commonly used. The other is the adoption by states and municipalities of stringent requirements covering storage and handling of the present films. Storage in outside buildings and well removed from other structures such as the method used at the Mayo Clinic is preferable. Where this is not feasible the regulations of the National Board of Fire Underwriters, which require outside vents, automatic sprinkler protection, and so forth, should be carried out.

The Public Health Council of New York state, acting on the recommendation of a special committee appointed by Acting Governor Lehman, has prohibited the sale and distribution of the ordinary nitrocellulose films in the state except in New York city, effective Sept. 1, 1929. Similar action will doubtless be taken in New York city also. This means that in New York the acetate films will replace those now in use.

It has been said that the detail furnished by the acetate films is inferior. They are more expensive owing to certain difficulties in manufacture. Certain large hospitals in the East, however, have used them exclusively for some time. It is rumored that the acetate films are likely to be made as efficient as the dangerous ones. That being the case the slight additional cost should not prevent their substitution.

THE TEACHING OF MASSAGE

Massage, mechanotherapy and physiotherapy being adjuncts of the treatment of the sick, the medical profession is interested in these subjects. Manual massage formerly was a profession in itself. Masseurs in this country at least have added mechanotherapy and in many instances physiotherapy to their armamentarium. Just how far the medical profession should go in backing the formation of an independent school by masseurs to teach these subjects is a question. It is felt by the Council on Physiotherapy of the American Medical Association that the teaching of physiotherapy should be carried on in connection with an established medical institution as is done at Harvard and Columbia universities.

While the State Board of Medical Examiners now has charge of the licensing of masseurs in Minnesota, this Board must, according to the law and quite naturally, depend on professional masseurs in determining eligibility of applicants. Whether a group of physicians should act as an advisory board to have supervision of the conduct of a school of massage, mechanotherapy and physiotherapy combined is open to some question. We should be inclined to recommend that the teaching of these subjects be made a part of established educational institutions.

The outline of a proposed independent school of massage, mechanotherapy and physiotherapy to be established in the Twin Cities was given publicity in the "President's Letter" in the July number of MINNESOTA MEDICINE. This should not be construed as an official endorsement of the project for no official action has been taken nor is likely to be taken by the State Medical Association. The name "Basic Science Institute and Sanatorium" proposed for the new school is misleading and consequently ill chosen.

The practice of massage as a profession in this country has not had the attention nor development that it has had elsewhere, for instance in the Scandinavian countries. Possibly there is need for a good school in this country and in our own state.

OZONE AND VENTILATION

The ill effects from lack of ventilation do not arise from any contaminating substance in the air but are due to the physical properties of the air—chiefly its lack of cooling power. "Bad air" is made so by being too warm, too moist or too stagnant. While ozone has been suggested as a means of neutralizing the carbon monoxide in the air, particularly in garages, this is based on the misconception that it combines with carbon monoxide in low concentrations. Its use in garages is inadvisable, as ozone, by its odor, will give a feeling of false security and thus foster a tendency to cut down ventilation. There has been no sound scientific work brought forward to show that there is any place whatever for ozone in the problems of ventilation; on the contrary the inefficacy of ozone generators has been demonstrated by careful scientific experiments. (Jour. A. M. A., June 29, 1929, p. 2186.)

OBITUARY

Charles Stanley McVicar

1880–1929

Dr. Charles Stanley McVicar of the Staff of The Mayo Clinic died suddenly at 4:00 p. m. June 29, at Winona. He had gone to Winona to play golf. At the second hole, he felt so ill that he returned to the club house, where he collapsed in the shower bath. The cause of death was coronary sclerosis.

Dr. McVicar was forty-nine years of age, was born April 5, 1880, in MacGillivray township, Middlesex County, Ontario. He was educated in the public and high schools in Ailsa Craig and Parkhill. At the age of nineteen he enlisted with the Canadian forces for service in South Africa, and served two years with the Strathcona Horse. On his return to Canada he entered the Western Medical College, London, where he studied for two years, from 1902 to 1904. The last two years of his medical course were taken at Toronto University, where he was graduated as Silver Medalist in 1907. He served eighteen months as intern at the Sick Children's Hospital, Toronto, and six months at the Manhattan Hospital, New York. On completion of his hospital training he engaged in practice in Toronto and was associated with the teaching staff of his Alma Mater.

During the World War Dr. McVicar again served with the Canadian Forces, this time in Salonika, where he was mentioned in dispatches for distinguished service, March 29, 1927, by General Milne. He was promoted to the rank of lieutenant colonel and served as Chief of Medicine in the Orpington General Hospital, England. From here he was recalled to Toronto to take charge of the Christie Street Orthopedic Hospital, which was the central orthopedic institution of the Canadian Army.

Dr. McVicar became a member of the medical staff of The Mayo Clinic in January, 1921. His interest was largely in the field of gastro-enterology. Owing to his outstanding ability, personality and industry he was soon made head of a section in gastro-enterology and Associate Professor of Medicine, The Mayo Foundation Graduate School of the University of Minnesota. He was deeply interested in teaching and investigation. In ward rounds he was usually attended by many visiting physicians, who quickly learned to recognize his ability as a teacher. He made several solid contributions to our knowledge of diseases of the gastro-intestinal tract and liver, in part due to his interest in the borderline between medicine and surgery in these diseases.

In 1912, he married Miss Mary Gillies of St. Marys, Ontario, who together with his son George and daughter Jeanette survives him. He is also survived by his mother, of Ailsa Craig, Ontario, and by his brother George of Cayley, Alberta. He was a member of the Presbyterian Church.

His broad viewpoint in medicine, his interest in both the clinical and scientific sides of medicine, his firm, sincere and fearless character, likable personality, dry sense of humor, his love of home and capacity for friendship marked him for leadership He was an excellent speaker and was in great demand for medical meetings throughout the United States and Canada. In the death of Dr. McVicar the Staff of The Mayo Clinic has lost one of its most valued and best loved members.

Louis McCargo Fowler

1901–1929

Dr. Louis McCargo Fowler, Fellow in Surgery in The Mayo Foundation since July 1, 1926, was drowned in Lake Pepin, near the Frontenac Inn, about 9:30 p. m. on Saturday, June 29, 1929. The day had been exceedingly warm, and just before nightfall a party set out from Rochester for a swim. Dr. Fowler started to swim to the raft alone in the darkness and apparently was seized with cramps. He called for help, but attempts at rescue by other members of the party, none of whom were strong swimmers, failed. The body was recovered about forty minutes after the accident. Unsuccessful attempts at resuscitation were made.

Dr. Fowler was born in Greensboro, North Carolina, September 27, 1901. He attended the University of North Carolina for four years and the University of Pennsylvania, where he received the degree of doctor of medicine in 1924. He served internship at the Robert Packer Hospital, Sayre, Pennsylvania. Dr. Fowler was well liked, and success was foreseen for him by his associates. At the time of his death, he was working in the Section on Orthopedics in the Division of Surgery, under the direction of Dr. M. S. Henderson.

LEVULOSE AND ARTICHOKES IN DIABETES

There is still considerable dispute as to the action of levulose in diabetes. One thing that stands out is that although levulose is well borne at first, hyperglycemia and glycosuria soon make their appearance. Jerusalem artichokes contain approximately 16 per cent of carbohydrate, chiefly inulin, which on hydrolysis yields levulose. Joslin showed that it was possible to substitute 15 Gm. of carbohydrate from Jerusalem artichokes for 5 Gm. from 5 per cent vegetables, but has cautioned that a small dosage should be used to avoid the danger of gastric upset. At a recent meeting of the American Chemical Society a paper was read reporting experiments in which varying quantities of dried artichoke and inulin were used in the diet of a diabetic patient: the conclusion reached was that Jerusalem artichokes are of doubtful value as a source of carbohydrate for diabetics. (Jour. A. M. A., June 22, 1929, p. 2124.)

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Doctor Bills in Installments

Clipping from *St. Paul Pioneer Press:*

"As a counter move against socialized medicine, characterized by free clinics and publicly supported medical service, the Chicago Medical Society has organized a finance corporation through which doctor bills can be paid on the installment plan. Operating after the manner of companies which finance automobile or radio purchases, the credit corporation will pay physicians a part of their fee promptly, take 13 per cent of the total as its share, and finance the patient, charging him 6 per cent interest on the unpaid balance of bills.

"The society has high hopes that this plan will help combat some tendencies it has been attacking. Sponsors believe indiscriminate charity will be discouraged and that worthy persons will be able to engage competent medical care on payments commensurate with their ability to pay. A financial arrangement of considerable convenience to doctors and patients will be created. Physicians will be served by an efficient collecting agency and will be protected against losses which are one reason for high costs of medical care.

"Millions of people already pay doctor bills on the installment plan. But at present it is a hit-or-miss kind of method under which medical service is available regardless of credit ratings, by which generous doctors work hard for meager returns and crafty people get free attention that they could pay for if they wished. The Chicago Medical Society has only systematized and organized practices which have long existed."

Socialized Medicine

Clipping from *St. Paul Pioneer Press:*

"The danger of socialized or state medicine, which has agitated the medical profession throughout this country, has been made the subject of an address by Dr. Charles B. Reed on his inauguration as president of the Chicago Medical Society. In Chicago the issue has caused a sharp controversy in which the society itself has participated.

"The day when socialized medicine triumphs will not be a fortunate one for America. If treatment of human ailments is to become increasingly a function of the state, then indeed physicians and patients will encounter complications of their existing troubles.

"But the medical profession may be sure that state medicine will not be a causeless development. If it comes, it will be the result of some failure to meet human needs with existing methods. If the medical profession will examine the problem frankly, it probably will find that the demand for state or socialized medicine springs from popular fear of financial burdens of medical service. The public has high confidence in the modern doctor's skill. But when sickness comes, for large numbers of middle class families the choice now lies between deliberately neglecting personal health, acceptance of charity or the assumption of debts for expensive specialized service which may take years to pay.

"No propaganda nor flair for socialism in America, where reliance upon individual initiative is so prevalent, can usher in state medicine if adequate medical service is made accessible to the public at costs which are within average means."

OF GENERAL INTEREST

Dr. S. F. Herrmann, formerly of Rochester, Minnesota, has moved to Tacoma, Washington.

Dr. H. N. Klein of Saint Paul has returned from Vienna, Austria, where he has been attending medical clinics.

Dr. J. C. Litzenberg of Minneapolis is in Seattle, where he will deliver a course of lectures at the University of Washington.

Announcement has been made of the engagement of Florence Eugenie Watkins of Winona to Dr. Donald W. DeCarle of Rochester.

Dr. and Mrs. Angus Morrison of Minneapolis with their four children, Clinton, Angus E., Anne and John V. Morrison, have returned from a four months' trip abroad.

Dr. and Mrs. Archie H. Beard of Minneapolis have returned from a three months' trip abroad, visiting England, Scotland, Sweden, Denmark, Austria, Switzerland and France.

Dr. H. Longstreet Taylor of Saint Paul has been elected head of the Ramsey County Public Health Association for the coming year. Dr. Taylor succeeds Mr. Edward P. Davis.

Dr. Scott Searles of Minneapolis, who has practised medicine in Minnesota since June, 1889, has announced his retirement, and the sale of his radium and laboratory interests to Dr. Ignatius J. Murphy.

Dr. Alfred W. Adson of Rochester has been appointed to the state board of medical examiners for a period of seven years, his term expiring in May, 1936. Dr. Adson succeeds Dr. Leon A. Barney of Duluth.

Dr. and Mrs. Wallace H. Cole of Saint Paul are attending the eleventh conference of the International Orthopedic Association in London. They will travel in England and Scotland before returning home in September.

Notification of his promotion to a captaincy in the medical officers' reserve of the United States army has been received by Dr. Alfred B. Hart of Owatonna. Captain Hart had previously been commissioned as first lieutenant.

The wedding of Dr. E. C. Hansen, Fairview Hospital, Minneapolis, and Miss Cecilia G. Kaupang of Northfield, Minnesota, was solemnized Saturday, June 15, 1929. Dr. and Mrs. Hansen are now at home in Minneapolis.

Dr. Ruben Nomland, formerly of The Mayo Clinic, Rochester, Minnesota, has announced the opening of an office at 55 East Washington Street, Suite 3705 Pittsfield Building, Chicago, for the practice of dermatology and syphilology.

Both Dr. W. J. Mayo and Dr. Charles H. Mayo attended and took part in the meeting of the British Medical Association at Manchester, England, July 22 to 25, 1929. Both received the degree of Doctor of Laws from the University of Manchester during their visit.

Dr. J. T. Asbury of Rochester, Minnesota, was accidentally killed the morning of July 4 while driving a tractor on the grounds of his new home north of town. Dr. Asbury was formerly a member of the State Medical Association but had largely retired from the practice of medicine.

Dr. Walter H. Ude of Minneapolis has announced the purchase of the *X*-ray Department of the Minneapolis Clinical Association, 701 La Salle Building. The department will be operated in the same location and in the same manner as in the past, Dr. Leo. G. Rigler acting as consulting roentgenologist.

Dr. Charles W. Hughes, who has charge of clinical research at the Veterans Hospital No. 106, Fort Snelling, has been transferred to Chicago. The clinic at Fort Snelling, which has been rated as one of the best in the country, has been conducted under the direction of Dr. Hughes since its inception when the hospital was opened Jan. 1, 1927.

Dr. Howard McI. Morton of Minneapolis has been chosen as a lecturer at the thirteenth International Ophthalmological Congress to be held at The Hague, Holland. Dr. Morton left in July and will be gone about three months. The congress meets every five years and its delegates go from all parts of the world to attend. The last meeting, five years ago, was held in the United States.

The American Association for the Study of Goiter has offered a prize of three hundred dollars and a medal of honor for the author of the best essay based upon original research work on any phase of goiter. Manuscripts must be in the hands of the corresponding secretary, J. R. Young, Rose Dispensing Building, Terre Haute, Indiana, by July 4, 1930. The purpose of the offer is to stimulate research work on the subject of goiter.

Dr. B. T. Horton of Rochester has been advised that he has been awarded the John Horsley memorial prize of $1,000. This prize was founded in 1925 by Dr. J. Shelton Horsley, as a memorial to his father. The prize is awarded every two years by a committee of the Medical Faculty of the University of Virginia for the best thesis on some subject in general surgery. It is open to all graduates of the Medical Department of the University of Virginia of not more than fifteen years standing. The first award was made in 1927 to Dr. C. B. Morton, a fellow in surgery in The Mayo Foundation. The subject of Dr. Horton's thesis was, "A study of pyloric block with special reference to musculature myenteric plexus and lymphatics."

CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*
Minnesota State Medical Association
11 West Summit Avenue
Saint Paul, Minnesota

1. *Question.*—Three year old girl fell and fractured the right femur immediatcly below the great trochanter. The fracture line is oblique, and the bones are in good position. She was treated in her home with vertical suspension and nine pounds of weight for traction to prevent overriding. Measurements showed about 1 cm. shortening at the time of injury, and at the present not over .5 cm. It is now four weeks after the accident, and I think the traction and suspension apparatus should be removed, and the paticnt allowed to lie in bed without any splint. Can she safely be allowed out of bed? What type of support will she need when she is up? How long should mechanical support be necessary? Is a walking type of Thomas splint the most satisfactory? Would a Thomas splint be adequate protection for the soft callus? Does such a splint have to be made for a patient? *X*-rays will be taken some time after traction is removed.

   Answer.—The following reply is based on the supposition that the fracture line is intertrochanteric, *i.e.,* one extending through the greater and lesser trochanters. This type of fracture when it heals gives better union than a similar fracture line in the shaft because of greater surface area of bone involved. Instead of taking the *x*-ray some time after the traction is removed, take your plates before any changes are made, as the future treatment of the case depends entirely on the amount of callus which is prcsent. The patient should be kept in bed with a weight applied for at least five or six weeks instead of four. If this is done, it may not be necessary to usc any other type of splint. When she is allowed out of bed, have her use crutches and at the end of seven or eight weeks allow her to walk alone. The *x*-ray should be your final guide before making any changes in the treatment.

2. *Question.*—Is it possible for me to run a drug store in connection with my practice? There is no other drug store for fifteen miles.

   Answer.—The State Board of Pharmacy informs us that no one except a registered pharmacist can run a drug store. It is possible for a physician to conduct a general store in connection with his practice and dispense his own medicines. It is not proper for him to call the place a drug storc nor to fill other doctors' prescriptions unless a registered pharmacist is also employed.

3. *Question.*—Patient became ill about five weeks ago with cervical adenitis, followed in ten days by a swelling over the clavicular region. The swelling has now extended down on the left side to the mammary gland, and there is also marked edema of the left arm. Dyspnea suggests mediastinal pressure. The pulse is rapid, and the temperature is low. We drained the cervical region and found nothing. The fluid resembled lymph. Can this swelling be caused by an accumulation of lymphatic fluid, causing the pressure on the subclavian vessel? Examination of thc gland by a pathologist showed no lymphosarcoma or lymphadenoma. We removed some milky fluid from the left chest. If this is a pleuritic exudate, I cannot understand the marked edema of the left arm.

   Answer.—The fluid from the chest of your patient is chyle. The probable source is obstruction with rupture or diapedesis of the thoracic duct or lymphangitis. The following conditions should be considered:

   1. Disease of the nodes (tuberculosis, Hodgkin's disease, lymphosarcoma, leukemia, suppurative adenitis)
   2. Aortic aneurysm
   3. Other mediastinal tumors (dermoid cyst, fibroma, metastatic carcinoma)
   4. Aberrant thyroid
   5. Thymoma
   6. Tumor of the esophagus (benign or malignant)
   7. Paravertebral abscess
   8. Diverticulum of the esophagus
   9. Encapsulated empyema

   The following procedures should be done: Fluroscopic examination, a flat plate of the chest, study of the mediastinum by the *x*-ray in the lateral view, blood examination, study of the contour of the barium-filled esophagus, and reexamination of the excised lymph node. If there is a mediastinal mass which does not pulsate and the blood shows no signs of leukemia, it would be advisable to give the patient the benefit of thc doubt and give a deep *x*-ray treatment over the mediastinum to relieve pressure. If the tumor responded to this treatment, it would mean that it was probably Hodgkin's disease, lymphosarcoma, thymoma, or aleukemia.

4. *Question.*—We have a patient with an aortic aneurysm, who has been under anti-syphilitic treatment for three years. We have becn using neosalvarsan, mercury rubs, and some potassium iodide. The blood Wassermann reaction remains positive, and we are wondering if you have any suggestions for more effective treatment.

   Answer.—If your patient has no other manifestations of syphilis, *e.g.,* neurosyphilis, and he is in good condition and has had no recent weight loss, the following treatment is advised: Give neosalvarsan at weekly intervals over a period of ten to twelve weeks. Three such courses should be given during the coming year. Very little success is obtained by using bismuth, mercury, or iodides, and these drugs are usually omitted in the treatment of syphilis of the aorta.

MISCELLANEOUS

SUMMARY OF THE NATIONAL TUBERCULOSIS ASSOCIATION MEETING, ATLANTIC CITY, MAY, 1929*

The Twenty-fifth Annual Meeting of the National Tuberculosis Association was a very interesting and instructive one. There were a number of papers presented showing new and valuable work done during the past year, the gist of which I wish to give you at this opportunity.

Dr. Eugene Opie, President of the Association and recipient of the Trudeau Medal for meritorious work during the past year, gave the opening address: The Epidemiology and Control of Tuberculosis. His paper concerned itself with facts relating to the wide dissemination of tuberculous infection, the uncertainty of its nature and the great need for more penetrating work amongst the children of grade school and high school age. A survey of high school children in Philadelphia showed that one in every hundred presumably healthy school children between the ages of 12 and 18 years has pulmonary tuberculosis, and that a larger number have a latent infection that has not as yet impaired health. Knowledge of the occurrence of tuberculous infection in the community and of the conditions that favor or retard its spread was considered the basis of all effective efforts to control the disease.

Dr. Walter Rathbun of Cassadaga, New York, also presented an interesting paper on juvenile tuberculosis. For the past six years, the Newton Memorial Hospital group has worked in the schools of Chautauqua County and the results were convincing that the public school is one of the most important fields in the control of tuberculosis. Definite evidence of latent tuberculosis was found in three and four per cent of the total school population. It was startling to learn that in the majority of high school students with pulmonary tuberculosis no history of reliable symptoms could be obtained either from the students themselves or the parents. Their disease, which was unmistakably evidenced and usually past the minimal stage, was discovered on routine *x*-ray and physical examination. Another interesting and valuable observation made was that in going into the home and *x*-raying the family group, the source of infection of these students in most instances was found.

Dr. H. H. Hetherington of Philadelphia gave some more instructive information relative to the occurrence of tuberculosis among the juvenile population of the public schools. Of 1,425 children between the ages of 15 and 19 years, 1.5% were found to have apical tuberculosis. Fifteen per cent had demonstrable tuberculosis of the tracheo-bronchial lymph nodes.

The work of Drs. Fenger and Mattill of Glen Lake Sanatorium proved to be a very interesting study of 3,011 school children in Hennepin County.

The impression gained from the papers on juvenile tuberculosis was the urgent need for thorough tuberculosis surveys in our public schools. The surveys could not possibly be complete or effective without the diagnostic use of tuberculin and the *x*-ray, for it was with the use of these measures that the most reliable information was gained. I was struck by the thought that we have in the State of Minnesota a splendid opportunity to contribute materially to the work already being done in this field and to gain an intelligent understanding of the actual amount of infection and disease present in the various communities. As Doctor Opie stated, such information is the basis for the gaining of effective control over this widespread disease.

The research side of tuberculosis showed the development of some very interesting work. Dr. S. A. Petroff of Saranac Lake, New York, presented his studies, revolutionary in nature, on "Microbic Dissociation of the Tubercle Bacilli." After twenty years of patient research work in the tuberculosis laboratory, he had finally accomplished a work which gave him satisfaction and held forth great promises. He found that if a typical virulent tubercle bacillus is cultivated on artificial culture media, two strains develop from it: the R strain and the S strain, indicating resistent to environment and sensitive to environment. The R type is the variant from the parent organism and is not very pathogenic, is stable, and does not produce symptoms. After a drop in temperature of the patient to normal and a loss of symptoms, there is found to be a predominance of the R type of organism. The S type is virulent, producing symptoms, and predominates at the time when fever is present. Reversibility of R into S may take place not only in the human and animal body, but by special cultural methods. Because of this possibility, Dr. Petroff is opposed to the Calmette vaccination method of children. There is no guarantee that an avirulent organism will not revert to a virulent one. Dr. Petroff is still in the midst of research work with these organisms, and when it is completed we can expect some very illuminating information on the subject of lesions and symptoms.

The very commendable report of Drs. Sabin, Doan and Forkner of the Rockefeller Institute showed the reaction of the tissues to the protein and lipoid fractions from the tubercle bacilli. A considerable amount of work had been done by injection of the various fractions singly into animals and noting the reaction to each individual product. Briefly stated, it was found that the toxic symptoms of the disease could be produced by the protein material and the specific lesions by the lipoids.

The research work of Dr. Leroy Gardner of Saranac lake on dust inhalation indicated that dust material such as quartz and to a lesser extent carborundum and granite would reactivate healing foci of primary infection.

One of the most valuable and encouraging papers of the meeting was the report made by Drs. David Smith and M. McConkey, Ray Brook, New York, on "Experimental Tuberculosis in the Guinea Pig Induced by

*This report of some of the important papers presented before the National Tuberculosis Association is a reprint of a letter sent to sanatorium superintendents of the state.

Feeding Tubercle Bacilli to Animals Living on a Diet Deficient in Vitamins." The special diet consisted of:

White bread, 20 per cent
Chipped beef, 20 per cent
Potatoes, 20 per cent
Oatmeal, 15 per cent
Skimmed milk, 15 per cent
Sugar, 10 per cent

It is adequate in calories, in protein of good quality, in mineral salts and in Vitamin B. It is relatively deficient in Vitamins A, C, D. It was found that guinea pigs fed on this vitamin-deficient diet and also given tubercle bacilli by mouth developed intestinal tuberculosis. Those fed on the same diet, but supplemented by 0.3 c.c. of cod liver oil and 10 c.c. of tomato juice daily, were protected from the development of this complication. Their work pointed clearly to the fact that a vitamin-deficient diet so alters the resistance of tissue as to make it vulnerable to tuberculous disease.

The results of the clinical application of cod liver oil and tomato juice therapy to tuberculous enteritis cases was presented by Dr. McConkey. Statistics, as well as careful clinical observations on 110 patients, showed the unquestionable value of this form of treatment for intestinal tuberculosis. It is administered as follows: one-half ounce of cod liver oil is floated on the surface of three ounces of ordinary tomato juice. The whole is chilled and served immediately after meals. It must be served ice cold. The work as presented gave one this impression. Here was a very simple and economical form of therapy which was valuable not only in the treatment of intestinal tuberculosis, but also for its prevention. If a properly balanced vitamin diet is effective in lesions along the intestinal tract, it would appear that it should also benefit tuberculous lesions elsewhere. The facts as presented, relating to this simple therapy, left me with the conviction that it should be given the benefit of a trial in all our sanatoria. It should be continued over a long period of time and careful observations made in an attempt to gain still more scientific data concerning its use and its results.

We have all wondered as to the length of time necessary to keep a lung collapsed in order to insure against a relapse. This subject was ably dealt with by Drs. J. Burns Amberson, Jr., and H. McL. Riggins, Loomis, New York. A paper was presented entitled, "A Report on One Hundred Sixty-seven Tuberculous Patients with Lungs Re-expanded After Artificial Pneumothorax Treatment." From their extensive experience they concluded that to insure the best ultimate results the pneumothorax treatments should be continued over a period of two to three years at the minimum. The 167 cases which they followed were patients where re-expansion of the lung had been present for five or more years. The best results were obtained in that group which showed a good collapse with closed cavities and over a three year period of collapse. Eighty-four per cent of these were living and 72 per cent were well. When one considers that these cases were selected from patients five to fifteen years after re-expansion had occurred, it gives us a rather encouraging picture of the ultimate fate of the pneumothorax patient. When one further considers that pneumothorax cases are selected from that group of patients who are not responding to ordinary bed rest and who otherwise would proceed to a fatal termination, then we are struck by the importance of this therapeutic weapon. From the work presented at this meeting, the impression was gained that collapse therapy has won a permanent place in the treatment of pulmonary tuberculosis.

I have included herein only those facts that I considered the most interesting and instructive. Time will not permit a résumé of the other splendid papers presented, but which you will be able to peruse when the proceedings of the national meeting are made available.

There is another element of importance relating to such gatherings that must be mentioned and that is the valuable contacts made with workers in various fields and in different localities. There can be no doubt but that the stimulus so gained is something which we should all attempt to make available for ourselves. It reflects itself in a favorable way upon our endeavors to combat successfully the tuberculosis problem.

Yours very sincerely,
Arnold S. Anderson, M.D.
Executive Secretary.

OXYGEN IN THE TREATMENT OF CORONARY OCCLUSION

PRELIMINARY REPORT

Robert I. Rizer, M.D.
Minneapolis

The results which I have gained from the use of oxygen in cases of coronary occlusion have been so good that I wish to make a preliminary report of its use in my cases. In my experience, previous to the use of oxygen, no treatment gave immediate relief of symptoms in an acute attack. This was due in part to the fact that the cause of the pain was not understood. An article by Kiefer and Resnick suggested that anginas were possibly due to anoxemia of the heart muscle. Acting on that suggestion, I determined to try oxygen in my cases of severe anginas and coronary occlusions. The results were that the patients have been relieved of symptoms which had not yielded to any of the usual forms of treatment. The relief of symptoms in all cases where oxygen was used came within two minutes after the application of the oxygen tent.

The relief of pain following the use of oxygen suggests that the pain in the attack is due not to a spasm of the vessels but to anoxemia of the heart muscle.

In the cases treated, the patient was placed in bed with the head slightly elevated. The oxygen tent was applied, and the apparatus adjusted to maintain a 50 per cent oxygen atmosphere. This treatment was continued from twelve to fourteen hours. The tent was

then removed, and the usual cardiac supportive measures were used.

The cases treated will be reported in full in a subsequent paper.

1931 Medical Arts Building.

OUR COUNTRY DOCTOR

We sing the praise of authors, of warriors and of men,
Who've climbed to heights of glory by their deeds of sword or pen;
We praise the bard, the statesman, the sportsman and the man
Who holds the fate of nations in the hollow of his hand.

But there's perhaps another who has ne'er received his due,
Who's spent long years of service in his work for me and you;
And though his deeds may never be proclaimed from shore to shore,
In fulfilling Christ's own mission other men have done no more.

No midnight call that came to him e'er fell on deafened ear,
The steady voice that answered seemed to drive away all fear;
No night too wild, no road too long, naught seemed to bar his way,
His aim was "Render service without one thought of pay."

For fifty years he's labored in a field of pain and strife,
As he traveled from youth's morning to the eventide of life;
He has eased the pain of thousands, he's rejoiced with us when glad,
And when death came to our household his heart too was sick and sad.

And we folks who do so little in behalf of humankind,
If we'd view his service record, one great lesson we might find;
The man who's in the limelight truly may be great and fine,
But we'll match our country doctor's with his record anytime.

MRS. ANNA FARRELL,
Farmers' Elevator Guide, July, 1929.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

THE AMERICAN PUBLIC HEALTH ASSOCIATION, THE AMERICAN CHILD HEATH ASSOCIATION

September 30 to October 5, 1929

The arrangements for the meetings of the American Public Health Association, the American Child Health Association and their related organizations in Minneapolis listed in the July number of MINNESOTA MEDICINE, are well under way. The preliminary program of the visiting health associations appears in the July number of the American Journal of Public Health.

The Conference of State Sanitary Engineers will begin its sessions at the Curtis Hotel, Minneapolis, on Saturday, September 28. The other members of the group, including the Conference of State Laboratory Directors, recently added to the promised gathering, will convene on Monday, September 30, at the Municipal Auditorium. It is hoped registration, which will begin Monday morning, will be practically completed on this date. Registration booths will be on the lower exhibition floor, adjoining the Commercial Exhibits. The headquarters of the American Public Health Association will be found at the southeast corner of the same area.

THE NORTHWEST CONFERENCE FOR CHILD HEALTH AND PARENT EDUCATION

The third annual session of the Northwest Conference for Child Health and Parent Education will open at the Auditorium on Wednesday, October 2, at 9:00 a. m. Its registration office will be on the first or street-level floor, near the Northwest entrance (Grant Street and Stevens Avenue). The ticket sales for the Conference have been abandoned for this year. Instead, registration is required, under a registration fee of One Dollar. Upon its completion, which can be secured now, and by mail, tickets of free admission will be issued which will cover attendance upon ALL meetings of the Conference, upon ALL sessions of the American Public Health Association, the American Child Health Association, and the related organizations as listed, and upon the Educational Health Exhibit.

The meetings of the Northwest Conference for Child Health and Parent Education will cover one and a half days, the morning sessions of Wednesday, October 2, and of Thursday, October 3, and the evening session of Wednesday, October 2, held conjointly with the American Child Health Association, occurring in the main audience room of the Auditorium; and the

luncheon and afternoon sessions of Wednesday, October 2, at the Curtis Hotel.

The adjournment of the Northwest Conference at noon on Wednesday is planned to give the members a special opportunity to visit and study the Educational Health Exhibit on the afternoon and evening of that day.

A preliminary program of the Northwest Conference will appear shortly.

A Popular Health Program, consisting of health talks, demonstrations, radio, delineascope and lantern slide exhibit is planned on the afternoon of each day from October 1 to October 5. Some excellent films will be presented.

Members of state organizations meeting conjointly with the national groups are urged to become members of the latter. If they do not desire to do this, they will be eligible to registration under The Northwest Conference for Child Health and Parent Education.

VISITORS TO THE MEETINGS

All visitors to the health meetings, who are not registered members or fellows of the national organizations or registered attendants upon the Northwest Conference for Child Health and Parent Education, will be asked to register as Visitors under a registration fee of One Dollar. Registration for visitors will open, coincidently with that for other groups, on Monday, September 30, at 9:00 a. m.

The Educational Health Exhibit, presented under the joint auspices of the American Public Health Association and the Northwest Conference for Child Health and Parent Education for the benefit of the people at large, will open on the morning of Tuesday, October 1, and will close at noon of Saturday, October 5. Admission will be by ticket, but without entering charge.

A large number of organizations are contributing to the creation of the educational exhibit. It will be housed on the first or street-level floor. It will interpret health to the people in very broad terms. It will be arranged under divisions of sanitation, or community hygiene; of disease discovery and prevention; of child development; of recreational activities; and occupational activities.

Attendants, in charge of each booth or group of booths, will reinforce the visitors' direct observation by any information they may seek.

The time has surely come when health education must be carried directly to the people and in plain, unmistakable terms. There is nothing concerning which the public is more clearly entitled to know. Those of the seeing eye and the hearing ear and the comprehending mind will find the opportunity in this exhibit to learn much of living interest and saving knowledge.

RICHARD OLDING BEARD, M.D.
Executive Secretary.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

The annual assembly of the Northern Minnesota Medical Association will be held at the Hotel Birchmont, on Lake Bemidji, at Bemidji, Minnesota, Monday and Tuesday, September 2 and 3, 1929. A two day program, with scientific papers by leading men in the state and visiting guests, has been planned. Entertainment will also be provided for the ladies. This is the annual outing meeting of the Association and a large attendance is expected.

The program for the two days will be as follows:

PROGRAM

Monday, September 2

9:30 A. M.–11:30 A. M.

MARY GHOSTLEY, M.D., International Falls
"Eclampsia and Its Mortality"

RALPH E. WEIBLE, M.D., Fargo, North Dakota
"Peptic Ulcer"

F. WHITMORE, M.D., St. Paul
"Psychoanalytic Problems"

A. M. SNELL, M.D., Rochester
"Some Recent Advance in Endocrinology"

M. G. GILLESPIE, M.D., Duluth
"A Study of Postoperative Hypothyroidism"

Luncheon, 12:00 A. M.–1:30 P. M.

N. O. PEARCE, M.D., Minneapolis
Subject to be announced

J. T. CHRISTISON, M.D., St. Paul
Subject to be announced

Pathological Symposium
W. A. O'BRIEN, M.D., Minneapolis
GEO. E. FAHR, M.D., Minneapolis
O. H. WANGENSTEEN, M.D., Minneapolis

Recess 3:00 P. M.–3:15 P. M.

L. L. BROWN, M.D., Crookston
"Immunity"

HENDRIE GRANT, M.D., St. Paul
"Eye Injuries"

W. F. BRAASCH, M.D., Rochester
"General Symptoms Secondary to Urinary Retention"

S. H. BOYER, M.D., Duluth
"Jaundice Problems"

Banquet 6:30 P. M.

Rev. W. C. SAINSBURY, St. Paul
M. O. OPPEGAARD, M.D., Crookston

Tuesday, September 3

8:30 A. M.–12:00 A. M.

A. L. MACDONALD, M.D., Duluth
Diagnosis and Treatment of Uterine Bleeding

MAX ALBERTS, M.D., St. Paul
Hyperthyroidism in Children

D. GRETH GARDINER, M.D., St. Paul
Bronchial and Esophageal Foreign Bodies

Business Meeting 10:00 A. M.

Gastro-intestinal Clinic
C. B. WRIGHT, M.D., Minneapolis
LEO RIGLER, M.D., Minneapolis
Diagnostic Dialogue

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Camp Release District Medical Society met in a midsummer session in Ramsey State Park at Redwood Falls, Minn., July 1, 1929, at 2 p. m., with President A. A. Passer presiding.

Inasmuch as the University extension course had so recently been concluded it was decided to make the meeting a social as well as a profitable one.

Dr. J. T. Ohlmacher, Professor of Bacteriology and Pathology, Medical School of University of South Dakota, Vermilion, gave an excellent address on the subject of "Preventive Medicine in the Light of Modern Scientific Knowledge."

Dr. C. M. Anderson, associate in the department of Ear, Nose and Throat of The Mayo Clinic, presented his subject, "Sinusitis in Relation to General Medicine," in a very illuminating as well as entertaining manner.

After the discussions, golf and other entertainment was indulged in, following which a dinner was served by the ladies' auxiliary to sixty guests, including the doctors and their families.

Drs. H. B. Cole, W. A. Brand, Thomas Flinn, and Brainerd Flinn, all of Redwood Falls, were the entertaining hosts at this delightful meeting.

L. J. Holmberg, M.D.,
Secretary.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The Southern Minnesota Medical Association met at Winona, June 15, in the Masonic Temple for a morning of Clinics. These included The Anemias by Dr. Frank Heck and Dr. C. H. Watkins of Rochester, Pediatric Clinic by Dr. J. C. Christison of St. Paul, a Neurologic Clinic by E. M. Hammes of St. Paul, and a Surgical Clinic by Dr. Owen Wangensteen of the University of Minnesota.

At noon the Society with their families and friends boarded the excursion steamer, Capitol, and lunch was served to 367 on the boat. While the guests and relatives enjoyed the Mississippi river scenery the members conducted a scientific session in an enclosed room on the mid-deck. It was interesting to note that practically every physician stayed throughout the meeting. The program was very interesting and well received. The program included, The Injection Treatment of Varicose Veins, by Dr. Lichtenstein of Winona; Peroral Endoscopy, by Dr. J. T. Schlesselman of Mankato; The Use of Iodized Oil in the Diagnosis of Thoracic Conditions, by Dr. E. K. Geer of St. Paul; Cases of Coronary Infarction with Survival, by Dr. J. A. Evans of La Crosse, Wisconsin; Recent Medical Development in the Treatment of Arthritis, by Dr. L. G. Rowntree of Rochester; Orthopedic Surgery in Arthritis, by Dr. Henry Meyerding of Rochester, and Bacteriologic Studies in Arthritis and Endocarditis, by Dr. B. J. Clawson of Minneapolis.

The evening session followed a banquet in the Masonic Temple and included the business meeting, a talk by Dr. W. J. Mayo and a talk by Mr. Cox on Upper Mississippi Wild Game and Fish Refuge. This was followed by several reels of motion pictures of African Big Game Hunting, by Dr. A. R. Metz, Chief Surgeon of the Chicago, Milwaukee, St. Paul and Pacific Railroad. Officers elected were Doctor Waltman Walters of Rochester, president; Dr. J. T. Schlesselman of Mankato, first vice president; Dr. C. B. McKaig of Pine Island, second vice president; and M. C. Piper (re-elected), secretary-treasurer.

The society voted to offer a suitable prize for the best scientific exhibition at the State Medical Association Meeting or to the Senior Medical Student at the University of Minnesota who contributes the best piece of original work in his senior year. The next meeting will be held at Mankato in the fall of 1930.

M. C. Piper, M.D.,
Secretary.

WABASHA COUNTY MEDICAL SOCIETY

The sixty-first annual meeting of the Wabasha County Medical Society was held at Wabasha, Minnesota, Thursday, July 11, 1929.

At the business session in the forenoon, the following officers were elected for the coming year: President, Dr. Russell H. Frost, Wabasha; Vice President, Dr. J. S. Collins, Wabasha; Secretary-Treasurer, Dr. W. F. Wilson, Lake City; Delegate to State Association, Dr. W. H. Replogle, Wabasha; Alternate, Dr. H. E. Bowers, Lake City; Censor for three years, Dr. J. F. Bond, Wabasha; Censors whose terms are unexpired are Dr. W. J. Cochrane, Lake City, and Dr. J. A. Slocumb, Plainview.

Topics pertaining to medical economics, welfare of the Society and public health education were discussed.

Dinner was served at Buena Vista Sanatorium, through the courtesy of the Sanatorium officials, to thirty-nine guests, including regular and affiliate members, dentists, visiting physicians, lay members of the Sanatorium Commission, representative of the press, and ladies accompanying.

The afternoon session was held on board the Yacht "North Star" tendered for the occasion through the courtesy of Doctor and Mrs. William J. Mayo.

During the boat ride on the Mississippi, the following program was presented:

President's Address—"Let Us Try," Dr. D. P. Dempsey, Kellogg.

"Careful Obstetrics," Dr. J. H. Simons, Minneapolis, Assistant Professor of Obstetrics and Gynecology, University of Minnesota.

"The Incidence of Tuberculous Infection in School Children," Dr. Russell H. Frost, Superintendent and Medical Director Buena Vista Sanatorium, Wabasha.

"Diagnosis and Treatment of Renal and Ureteral Calculi" (Lantern Demonstration), Dr. Philip F. Donohue, St. Paul. Department of Urology, University of Minnesota.

Appreciation of the entertainment features, and satisfaction with the program generally was individually spoken, and publicly expressed through a vote of thanks extended to all taking part in making this meeting a pleasant and instructive event.

W. F. Wilson, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

CLINICAL SIGNIFICANCE OF THE WATER OF METABOLISM IN CHILDREN: Hyman Goldstein, M.D., New York (Arch. of Ped., June, 1929, Vol. XLVI, No. 6). The human body, particularly that of the child, is a huge chemical laboratory with an important irrigation system. Every kilogram of body weight contains from 0.6 to 0.7 kilogram water. A child weighing 50 pounds actually weighs 15 to 20 pounds in solids and 30 to 35 pounds in water content. Metabolism is a part of these chemical processes constantly going on in the body cells and fluids by virtue of oxidation. Water, as an intermediary in all these reactions, is absolutely necessary. The blood is being continually depleted of water and the loss must be made up by the ingestion of new water.

It is very essential that the child during health and disease keep a proper water balance. Rubner early called attention to the fact that in starvation an animal can lose most of its glycogen, fat and half of its body protein, approximately 40 per cent of this weight, and still live, whereas the loss of 10 per cent of water content of the body results in serious disorders, and the loss of 20 per cent results in death. Water is essential to the life and function of every living cell.

Diet modifies water balance a great deal. Carbohydrates and proteins favor water retention, but in excess, especially if protein is over 20 per cent of the total calories, metabolism and water loss is stimulated and hence weight loss. If carbohydrates are down to less than 3.5 per cent in the diet, acidosis may result. High fat diet encourages water loss and indirectly weight loss. In severe cases of vomiting with great loss of water and hydrochloric acid, there may be retention of alkalies, and alkalosis. There is no question but that marked changes in the water balance causes the same influence to partly change the alkaline reserve. Fortunately the latter content of the plasma is easily compensated and therefore more or less constant.

In considering the importance of keeping the water balance we must consider cause and effect in our clinical observations of diseases of children. We must recognize early symptoms and note the connection that exists between clinical states. This knowledge and clinical observation should give us intuition as to how and when to employ water therapy when indicated to prevent or treat dehydration and other serious conditions.

R. N. Andrews, M.D.

RESPIRATORY DISORDERS IN INFANTS: Harold Abramson, M.D., and Louis H. Barenberg, M.D., New York (Jour. A. M. A., June 29, 1929, Vol. 92, No. 26). An attempt was made to lessen the incidence of these infections by putting into practice the principles of "aseptic nursing." During the course of a winter all persons coming in contact with the infants in one ward were required to wear surgical masks and to scrub their hands thoroughly before the examination or the handling of the children. A comparison made with infants in a control ward where no such measures were carried out showed that a decrease in respiratory diseases of only 10 per cent was accomplished by this means. The greatest difficulties lay in occasional infractions of technic on the part of the nurses, as well as in the impossibility of absolutely preventing contact infections, from child to child. Infants who were kept in cribs showed almost a 50 per cent higher incidence of respiratory disorders than those cared for in bassinets. The frequency of infection per child was less in the protected than in the control ward.

Aseptic nursing was of no value to preventing the spread of an outbreak of varicella.

R. N. Andrews, M.D.

HYPEREMESIS HIEMIS OR THE WINTER VOMITING DISEASE: John Zahorsky, M.D., St. Louis (Arch. of Ped., June, 1929, Vol. XLVI, No. 6). Vomiting and diarrhea are frequent symptoms of respiratory infections. The disease usually begins suddenly, but often the older child complains of abdominal pains for one or two days preceding the acute attack.

The first alarming symptom is vomiting. This is violent and forcible and often accompanied by symptoms of collapse, *i.e.,* extreme pallor and prostration. The vomiting continues for one or more days.

Within a few hours after the vomiting begins, a looseness of the bowels is observed. Only exceptionally

have cells been found in the stools while in summer diarrheas a massive cellular content is generally present.

The young child lies for one to three days listless, sometimes in a semicomatose or stuporous state. The temperature in uncomplicated cases is not high. Recovery occurs invariably after a few days. The physical examination shows nothing of importance. There is no tenderness of the abdomen and only exceptionally is distention present.

R. N. Andrews, M.D.

APPENDICITIS IN CHILDREN: Charles E. Farr, M.D., New York (Arch. of Ped., June, 1929, Vol. XLVI, No. 6). It has been for years the author's practice, in hospital work, to consider every doubtful abdominal case as one of appendicitis.

If one errs on the side of being too radical, very little harm ensues. The operation is practically without danger; moreover a very probable source of future danger has been removed.

Tenderness, sensitiveness rather, at the usual site of the appendix, or along the outer border of the colon, or in the right side of the pelvis, by rectal examination, is highly suggestive.

It is only in the advanced stage of spreading peritonitis, or the overwhelming insult of an acute perforation, that we meet with the higher degrees of abdominal rigidity. Generally infants and young children will show more rise in temperature than similar cases in adults. In leukocytosis and polynucleosis the same is true. In *x*-ray if the appendix fails to appear at all on the plate, or if, having been filled, it fails to empty in 72 hours, or if, being surely located, it remains fixed in position and is tender on pressure, the diagnosis is almost certain.

Survey of a series of cases (1,459 in number) of appendicitis in children seems to prove:

1. That appendicitis is very common in childhood.
2. Chronic appendicitis, or a crippled appendix may exist from birth.
3. The difficulty of diagnosis is great but not insurmountable.
4. Chronic appendicitis shows practically no operative mortality in childhood.
5. Early diagnosis of acute cases and early operation yield just as good results in children as in adults.

R. N. Andrews, M.D.

THE NINHYDRIN TEST IN PREGNANCY

The Abderhalden Ninhydrin test for pregnancy has fallen into disrepute. There is no evidence that a specific ferment exists in pregnancy. While tests on serum from pregnant women are uniformly positive, the large number of positive results on the serum of men and non-pregnant women proved the test of no value for the diagnosis of pregnancy. (Jour. A. M. A., March 9, 1929, p. 829.)

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

VIRGIL J. SCHWARTZ,
PHYS. & SURG. BLDG., MINNEAPOLIS

ARTHUR C. DEAN
CROOKSTON CLINIC, CROOKSTON

A STUDY OF POST-TONSILLECTOMIZED INDIVIDUALS: Arthur J. Wagers, M.D., Philadelphia, Pa. (The Laryngoscope, May, 1929, XXXIX, 310). The decision to remove the tonsils in the patients coming to the clinic of a large hospital is often based upon the most superficial examination and study of the patient.

Tonsils which have once been attacked by acute inflammation of the follicles are prone to subsequent attacks, so that in time the tonsil tissue shows evidence of chronic infection, and this local condition, resulting in absorption of toxins, is, in large measure, responsible for frequent attacks of various ailments in the case of school children. Chronic otorrhea and impairment of hearing are conditions which, to my mind, are only very indirectly affected by the presence of infected tonsils. In some instances their removal may be helpful in restoring the ears to normal, but I believe it is a mistake to tell patients nothing can be done for their ears until the tonsils have been removed.

The cases in this particular series number 274 of all ages, from two to sixty years. They have been divided arbitrarily into three age groups—those under eleven years, those from eleven to twenty-five, and those above twenty-five years of age.

Twelve months after operation, from the first group we had forty-six reports of conditions present. Twenty had been free from sickness and twenty-six reported disturbances of minor importance. In the second group twenty-three reported. Twelve of these had not been ill since the operation, eleven had been ill at some time and from more serious complaints than those suffered by the younger group. In the third group we had fifteen re-examinations out of an original forty-one. There had been no postoperative illness in five of these, while ten had suffered from various ailments.

It is noted with some satisfaction that the majority were benefited, but this study also serves to impress on us the fact that the tonsils are not alone responsible for all the suffering to which human flesh is heir.

CONCLUDING SUMMARY

Original examinations were made of 274 cases.

Subsequent interviews or reports were obtained in 84 cases.

No illness within one year or longer following operation reported by 37.

Illness of some description reported by 47. Definitely improved by operation, 63. Not improved by operation, 21.

Arthur C. Dean, M.D., F.A.C.S.

ROENTGENOLOGY

SUPERVISORS

LEO G. RIGLER
MINNEAPOLIS GENERAL HOSPITAL, MINNEAPOLIS

A. U. DESJARDINS
MAYO CLINIC, ROCHESTER

CHOLECYSTOGRAPHY: Byrl R. Kirklin, M.D. (Arch. of Surg., June, 1929, Vol. 18, No. 6. Pp. 2246-2256). The advances in roentgenologic diagnosis of disease of the gallbladder have been rapid since 1924, in which year Graham and Cole announced calcium tetrabromphenolphthalein as a cholecystographic agent. The questions of the advantages of various dyes, the use of the oral or intravenous method of administration, the real place of cholecystography in medicine are subjects which had occupied considerable space in the literature.

Doctor Kirklin reviews the subject and analyzes the present status of this means of diagnosis beautifully.

At the Mayo Clinic sodium tetraiodophenolphthalein has been given orally to many thousand cases without untoward results and the method compares favorably with results obtained by intravenous checks on selected cases.

Concerning efficiency he brings out four main points which account for error in diagnosis and the variance in results in different sections of the country.

1. Lack of knowledge as to the line of demarcation between the normal and abnormal gallbladder from the surgeon's, anatomist's, physiologist's and histopathologist's standpoint.

2. Differing conceptions as to the cholecystographically normal and abnormal gallbladder.

3. The use or non-use of the clinical data in arriving at cholecystographic diagnosis.

4. Differences in the character of the material on which the computations are based and in the methods of analysis.

The author feels that a true roentgenologic diagnosis should be made without knowledge of the clinical history of the case; the results given to the clinician to whom properly belongs the correlation of all facts from all sources.

Reliable indicia of gallbladder abnormality are three in number:

1. Absence of shadow.
2. Faintness of shadow.
3. Mottling of the shadow.

Irregularities of contour seldom denote intrinsic disease.

Since cholecystography is preëminently a test of the ability of the gallbladder to receive and concentrate dye-laden bile, and since this capacity does not have a constant relation to health and disease, the report to the clinician should be in terms of function, not of anatomic condition. At the Mayo Clinic reports are given in three forms:

1. Normally functioning gallbladder.
2. Poorly functioning gallbladder, when the shadow is faint.
3. Nonfunctioning gallbladder when the shadow or viscus is not seen.

Evidence of stones may be reported in any of the above types.

Accuracy in diagnosis of cholecystic disease at the Clinic increased from 79 per cent in 1925 to 90 per cent in 1927, and has been on the increase since. This compares favorably with statistical reports.

In conclusion the author states that cholecystography is a remarkably able coadjutor, but, whatever it may reveal, the clinician cannot forsake his prerogative and duty to correlate the data with his own information, weigh the probabilities of disease, estimate its gravity and recommend appropriate treatment.

CHARLES MAYO, II.

NEW AND NON-OFFICIAL REMEDIES

The following article has been accepted by the Council on Pharmacy and Chemistry:

PARKE, DAVIS & CO.

Ampoules of Pitocin
Ampoules of Pitressin

TRUTH ABOUT MEDICINES

Insulin-Squibb, 80 units, 10 c.c.—Each c.c. contains insulin-Squibb (New and Non-official Remedies, 1929, p. 197) 80 units. E. R. Squibb & Sons, New York.

Diphtheria Toxoid.—A diphtheria toxoid (New and Non-official Remedies, 1929, p. 368) prepared from diphtheria toxin of which the L+ dose is 0.25 c.c. The toxin is treated with formaldehyde according to the specifications of the U. S. Public Health Service until it is detoxified. It is tested for antigenic power by subcutaneous injection into guinea-pigs. Diphtheria toxoid-P. D. & Co. is marketed in packages containing one bulb (0.5 c.c.) of dilute diphtheria toxoid for the reaction test and two bulbs (0.5 and 1.0 c.c. respectively) of diphtheria toxoid; also marketed in hospital packages. Parke, Davis & Co., Detroit.

Petrolagar (with Milk of Magnesia).—Liquid petrolatum (New and Non-official Remedies, 1929, p. 228) 65 c.c.; magnesia magma, 8 c.c.; emulsified with agar in a menstruum containing sugar, flavoring, sodium benzoate 0.1 Gm., and water to make 100 c.c. Petrolagar Laboratories, Inc., Chicago. (Jour. A. M. A., June 1, 1929, p. 1837.)

Bismarsen — Sulpharsphenamine Bismuth — Bismuth Arsphenamine Sulphonate.—The sodium salt of a bis-

muth derivative of arsphenamine methylene sulphonic acid with inorganic salts. It contains approximately 13 per cent of arsenic and 24 per cent of bismuth. Bismarsen is used in the treatment of syphilis. The drug is reported to be somewhat slower in its action than intramuscularly administered sulpharsphenamine or intravenously administered neoarsphenamine, but much more rapid than bismuth. More or less severe pains at the site of injection have been reported. Bismarsen is administered intramuscularly. Abbott Laboratories, North Chicago, Ill. (Jour. A. M. A., June 8, 1929, p. 1928.)

Digifoline-Ciba.—A digitalis preparation containing the active glucosides of digitalis, free from extractive matter. It is standardized to have the strength of digitalis leaves as standardized by the frog method of Focke. The actions and uses of Digifoline-Ciba are the same as that of digitalis. It may be administered orally, rectally, or by subcutaneous, intramuscular or intravenous injection. Digifoline-Ciba is marketed in the form of Ampules Digifoline-Ciba Solution, Digifoline-Ciba Liquid and Tablets Digifoline-Ciba. Ciba Company, Inc., New York.

Concentrated Pollen Extracts-Swan-Myers.—In addition to the products listed in New and Non-official Remedies, 1929, p. 26, the following product has been accepted: Canada Blue Grass Concentrated Pollen Extract-Swan-Myers. Swan-Myers Co., Indianapolis.

Sulpharsphenamine-Searle, 0.1 Gm. Ampules.—Each ampule contains sulpharsphenamine-Searle (THE JOURNAL, April 20, 1929, p. 1349) 0.1 Gm. G. D. Searle & Co., Chicago.

Sulpharsphenamine-Searle, 0.2 Gm. Ampules.—Each ampule contains sulpharsphenamine-Searle (THE JOURNAL, April 20, 1929, p. 1349) 0.2 Gm. G. D. Searle & Co., Chicago.

Sulpharsphenamine-Searle, 0.3 Gm. Ampules.—Each ampule contains sulpharsphenamine-Searle (THE JOURNAL, April 20, 1929, p. 1349) 0.3 Gm. G. D. Searle & Co., Chicago (Jour. A. M. A., June 15, 1929, p. 2021.)

Ampules Luminal-Sodium (Powder), 2 grains.—Each ampule contains 2 grains of luminal-sodium (New and Non-official Remedies, 1929, p. 81). (Jour. A. M. A., June 22, 1929, p. 2101.)

A NATIONAL CAMP-SAFETY CODE

The formulation of minimum standards of camp safety was decided upon at a recent meeting of representatives of 14 national organizations interested in summer camps. It was suggested that the research and secretarial work for the compilation of this "code" could be handled through establishing a graduate fellowship at Teachers College, Columbia University. For this purpose the National Bureau of Casualty and Surety Underwriters has offered a $1,000 fellowship for the coming year, open to candidates for a doctor's degree with comprehensive campaign experience.

—Children's Bureau.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

THE CONQUEST OF CANCER BY RADIUM AND OTHER METHODS. Daniel Thomas Quigley, M.D., F.A.C.S., Instructor in Surgery, University of Nebraska School of Medicine, Director of Radium Hospital, Omaha. 539 pages. Illus. Cloth, $6.00. Philadelphia: F. A. Davis Company, 1929.

GONORRHEA AND KINDRED AFFECTIONS. George Robertson Livermore, M.D., F.A.C.S., Prof. of Urology, University of Tennessee, and Edward Armin Schumann, A.B., M.D., F.A.C.S., Assoc. Prof. of Obstetrics, University of Pennsylvania. 257 pages. Illus. Cloth, $5.00. New York: D. Appleton & Co., 1929.

REPORT ON FOURTH INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY. (Warsaw, Poland, May-June, 1927.) Commander William Seaman Bainbridge, M.C-F., United States Naval Reserve, Member of Permanent Committee, Delegate from the United States. 248 pages. Illus. No price listed. Menasha, Wisconsin: The Collegiate Press, George Banta Publishing Company.

CLINICAL LABORATORY METHODS (3rd edition). Russell L. Haden, M.A., M.D., Professor of Experimental Medicine, University of Kansas School of Medicine. 317 pages. Illus. Cloth, $5.00. St. Louis: C. V. Mosby Company, 1929.

OSTEOMYELITIS AND COMPOUND FRACTURES. H. Winnett Orr, M.D., F.A.C.S., Chief Surgeon Nebraska Orthopedic Hospital, Orthopedic Surgeon, Lincoln General Hospital. 208 pages. Illus. Cloth, $5.00. St. Louis: C. V. Mosby Company, 1929.

PRINCIPLES AND PRACTICE OF ELECTROCARDIOGRAPHY. Carl J. Wiggers, M.D., Professor of Physiology, School of Medicine, Western Reserve University, Cleveland, Ohio. 226 pages. Illus. Cloth, $7.50. St. Louis: C. V. Mosby Company, 1929.

THE TREATMENT OF FRACTURES. Lorenz Boehler, Chief Surgeon and Director Vienna Accident Hospital. Translated by M. E. Steinberg, M.S., M.D., Portland, Oregon. 185 pages. 234 illus. Cloth, $5.00. Vienna: Wilhelm Maudrich (Spitlagasse 1B, Ecke Mariannengasse), 1929.

ANNUAL REPRINT OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 1928. Cloth. Price, postpaid, $1.00. Pp. 75. Chicago: American Medical Association, 1929.

This book is a great deal more than a mere record of the negative actions of the Council on Pharmacy and Chemistry. It gives in full the reasons for the Council's rejection of various preparations, but it also records

results of the Council's investigations of new medical agents not yet out of the experimental stage, and frequently contains reports on general questions concerned with the advance of rational drug therapy. All three categories of reports are represented in the present volume.

Among the reports on products that have been denied admission to New and Non-official Remedies are those on Sanarthrit and Telatuten, two preparations of animal tissue, of indefinite composition, proposed for use in arthritis and arteriosclerosis respectively; on Clauden, a combination of lipoids and undefined proteins, proposed for use as a hemostatic; on Hart's Alimentary Elixir of Beef, a liquid medicinal food, "fortified" with glycerophosphates; on Alucol, claimed to be colloidal aluminum hydroxide and marketed under this nondescriptive name; on Oxo-Ate and Oxo-Ate B, claimed to be the ammonium and calcium salts, respectively, of orthoiodoxybenzoic acid and marketed under these proprietary, nondescriptive names; on Terpezone, stated to be pinene ozonide and marketed with exaggerated and unwarranted claims; on Vitalipon, an unscientific and indefinite mixture of lipoids claimed to be extracted from "vegetable and animal embryonic organs"; on Kalak Water, a solution containing sodium bicarbonate with many other ingredients of questionable utility, marketed under a nondescriptive name with unwarranted therapeutic claims; on Eu-Med, Aerosan Tablets, and Thyangol Pastilles, three shot-gun mixtures from Germany.

Among the preliminary reports are those on Metrazol, which has now been admitted to New and Non-official Remedies; on Phenylaminoethanol sulphate, a newly synthesized ephedrine substitute; on Ovarial-hormon Folliculin Menformon, the ovarian preparation originated by Dr. Laqueur of Amsterdam; and on Heparmone, a liver preparation.

The special report dealing with dextrose solutions containing cresol and intended for intravenous administration is a noteworthy example of the third category of Council reports we have mentioned.

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FRACTURES OF BONES OF HAND AND FINGERS*

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FRACTURES of the bones of the hand, wrist, and fingers seem so unimportant that they are seldom discussed in medical meetings, and if a paper is printed on this subject, probably but few read it. In spite of the apparent simplicity and ease with which they seemingly should be reduced and held in good position and alignment, the results are so often unsatisfactory that they ought to be given more study and attention than they have received in the past. These fractures are important. They are major fractures. No part of the body is used so constantly, and so continuously, as the hands and fingers. Their functions are many and varied. The rapidly increasing use of machinery in all branches of industry renders a satisfactorily functioning hand of far greater importance than ever before. A review of cases coming before the compensation boards shows a very high percentage of hand injuries. According to reports from the Massachusetts General Hospital, these average 90 per cent of all compensation cases.

Actual experience shows that while a simple fracture of a metacarpal or phalangeal bone without displacement and in good alignment is one of the simplest and easiest fractures to treat, be they carpal, metacarpal or those of the forearm, the average case is far from simple, most of them are difficult to hold in good position and alignment, and many of them almost impossible.

CARPUS

In injuries of the carpus or wrist, the first difficulty encountered is diagnosis. A swollen, painful, tender wrist with restricted motion is very deceiving, and an *x*-ray film should be taken, and carefully studied to determine the condition present.

The deformity may be but slight; injury to the radius and ulna, and also to the metacarpals, can usually be ruled out especially after an *x*-ray has been taken. Even then, the diagnosis may be hard to make, because there are eight small bones in a very small compact space, each bone overlapping the adjacent bones; and further, the average physician is not often called upon to treat carpal fractures, so it is hard for him to diagnose the true condition. An *x*-ray is absolutely necessary to make a diagnosis in most carpal fractures, and a stereo *x*-ray is of very decided advantage and, in all doubtful cases, should be taken. A stereo taken from the dorsal side and another stereo taken from the volar side will help. Note this—no examination of an injured wrist is complete until a lateral *x*-ray film has been taken. Only those who, like myself, have had the chagrin of missing a dislocated semilunar bone, can appreciate this. Such an error is sometimes very costly to the physician, or his insurance company. But unless one is exceptionally skillful in reading an anteroposterior film of the wrist, most dislocated semilunar bones will be missed. A lateral view is essential. The only time dislocated semilunars can be reduced is when they are fresh. After the acute swelling has gone, it is usually too late. Outside of severe crushing injuries which may fracture any, or all, of the carpal bones, the ones usually injured are the scaphoid or navicular, and the semilunar or lunate. The injury is usually a fall on the hand, or, what frequently amounts to the same thing, a blow on the palm, as by an auto engine back-firing while being cranked, the hand being pronated and hyperex-

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tended, and in ulnar or radial flexion, the same cause that usually fractures the lower end of the radius. The scaphoid acts as a buffer between the os magnum and radius, the scaphoid giving way instead of the radius. The scaphoid is usually broken transversely across its neck. Cotton says, "Apparently, there is no considerable displacement in the majority of these cases immediately following the accident." Usually the patient has tried to use his hand, or manipulation has been attempted, and by the time an *x*-ray has been taken there is displacement of fragments.

Symptoms.—The wrist is swollen, but this swelling may be limited to the region of the scaphoid, instead of a general swelling over the entire wrist; tenderness is present between the end of the radius and the first and second metacarpal bones. Movement of the wrist is painful in any direction, but especially in dorsiflexion and radial deviation. The wrist is weak, the hand-grasp is poor, and a continuous ache is present. Pain and aching are increased by use and relieved by rest or immobilizatiion. Stereo plates of the two wrists, palms downwards, thumbs together, ulnarly deflected, will usually give the best view for diagnosis. A lateral view should also always be taken, as the lunate bone may be dislocated in addition to the fracture of the scaphoid.

Treatment.—If seen early, and if not displaced, the treatment is dorsiflexion of the wrist and hand, including fingers, the hand and fingers being in the position of grasp—the thumb beneath index finger, and fingers slightly flexed. This position gives the most useful position for function, and it is the position of choice for all fractures of the carpus. A moulded plaster-of-Paris cock-up splint carefully moulded around the palm of the hand, and extending from near the elbow to finger tips, is satisfactory. Immobilization in this position should be retained at least three or four weeks in adults, after which a short cock-up splint may be used for one or two weeks, followed by a moulded leather wristlet. After this, massage, active motion, bathing with hot water, contrast hot and cold baths, are all necessary and important for two or three months.

In cases of malposition, if seen early, an attempt to replace should be made under ether, using strong traction with flexion and pressure on the displaced bone. In cases where reduction is impossible, operation should be done, and two procedures are used. The most commonly used and generally accepted procedure is to remove the proximal fragment, or both fragments. More recently, bone graft operation has been used successfully by using a bone peg, as advocated at the Massachusetts General Hospital fracture clinic. Either of these operations is followed by a plaster-of-Paris cock-up splint for at least six weeks. Function following removal of part or all of the scaphoid is usually good. The reports of cases that have been grafted are very good. The best exposure for operation is through the dorsum of wrist, on the ulnar side of the long extensor tendon of the thumb. Incision on the palmar surface of the wrist, in addition, is necessary in some cases.

SEMILUNAR BONE

Fracture of the semilunar is quite rare, and when it does occur it is usually with dislocation.

Dislocation of the semilunar is not uncommon, and may, or may not, be associated with scaphoid fracture. The dislocation is nearly always anterior and caused by a fall on the dorsiflexed hand or a blow on the dorsum of the wrist in hyperextension. The distal carpal row of bones is carried backwards, leaving increased space between the os magnum and lower end of the radius. When force is applied, the lunate is forced forward through torn ligaments. The radio-lunar ligament usually holds, and this causes the bone to rotate, so its concave surface looks anteriorly instead of distally.

Symptoms are swelling of the wrist and unusual prominence on the anterior surface of the wrist. Pain and tenderness are marked and motion of wrist and fingers is very limited. Extension of the fingers and dorsiflexion of the wrist are impossible. An antero-posterior film of the wrist is apt to be deceptive and to lead any but an expert to believe no dislocation exists. A lateral view shows the very typical, and clearly visible dislocation of the bone, with characteristic forward-looking concavity.

Treatment.—If seen early, reduction may be effected by placing the hand in extreme dorsiflexion, making strong pressure with the thumb on the displaced bone on the anterior surface of wrist, then making extreme anterior flexion of

wrist. Repeated efforts under the fluoroscope are usually necessary. Similar motions may be used with the Thomas wrench, placing the distal end anteriorly.

If these attempts fail, or if the case is an old one, operation is needed to attempt reduction. Davy has made a bone skid with which he claims he has reduced dislocations of two months standing. If reduction is impossible, the bone should be removed, as a dislocated semilunar, if complete, or nearly so, leaves a badly crippled and very painful wrist. An anterior incision on the inner side of the brachioradialis tendon is used, care being necessary not to injure the radial artery or nerve. The results following removal should be good.

Fractures of the other carpal bones do occur, though rarely. Treatment is to reduce if possible, and put up on an anterior cock-up splint, with hand in position of grasp. If impossible to reduce, or if non-union occurs, excision must be done.

Kienbock's disease must be remembered in connection with wrist injuries. It is the result of a fractured semilunar bone, followed by absorption of the fragment. Diagnosis is made by *x*-ray film. The symptoms are pain and tenderness, localized over the semilunar, with wrist joint disability. In some cases the head of the third metacarpal is retracted. If seen early, conservative treatment may be used, but if late, operation is required. The results are not very satisfactory.

FRACTURES OF THE HAND

Fractures of the wrist are not very common, but when we come to the metacarpal and phalangeal bones, we enter a field of frequent injury. These bones are so accessible, so easy to feel, and the diagnosis usually so clear and plain, that it would seem that these fractures would be easy to treat. On the contrary the results are too often unsatisfactory, and anyone who has treated many of these fractures will, I think, agree that very many are extremely hard to hold in satisfactory position. The chief reason for this is the many and powerful muscles of the forearm and hand which are attached to these comparatively short bones, all of which are constantly pulling on the bones in varying directions. These forces tend to cause displacement of the broken fragments, with resulting deformities, stiffness, and loss of motion. A review of compensation cases shows that a large per cent of smashed hands and fingers result in deformed hands or useless fingers. And with the use of machinery increasing rapidly, the number of injured digits is certain to continue high in spite of safety devices to prevent accidents.

One factor which has not been given sufficient consideration in the past in these fractures is the preservation of the normal arches of the hand. These arches are both longitudinal and transverse. The longitudinal arch not only conforms with the curve of the metacarpals, as well as each of the phalanges, having their concavity toward the palm, but, in addition, these arches are emphasized and increased by the muscle pads forming the thenar and hypothenar eminences, and also the enlargement at each end of the metacarpal bones, so that each metacarpal bone forms a longitudinal arch, that of the first, second, and fifth being more marked than that of the third and fourth. Transverse arches may be considered roughly as proximal and distal. The proximal arch is formed by the arching or bowing caused by the position of the carpal bones, and the heads of the metacarpal bones. The distal arch has a more gentle curve, and is formed by the enlargement of the distal end of each metacarpal bone. For good function, grasping power, free and easy movement of the thumb and fingers, the preservation of these arches of the hand is just as important as the preservation of the arches of the foot. In the treatment of the fracture of the hands and fingers, these normal arches and their preservation must be taken into consideration and carefully looked after.

With the development of the banjo extension splint for these fractures, one very important advance has been made; and if careful, intelligent, and very diligent attention be given from the start and carried on and maintained daily throughout the entire healing period, most of these fractures should give good results. But it is only by applying the right principles of treatment, together with constant watchfulness and very careful attention to details day after day, that we can expect to get that optimum triad of results, anatomical, functional, and economic, so repeatedly emphasized by Dr. Nathaniel Allison. The banjo splint "consists of a plaster casing of the forearm with palmar sup-

port, in which is incorporated a rectangular frame of iron wire, to which the rubber tubing or elastic bands which take the extension from the digits is attached. The splint may be modified according to the number of fingers involved. The amount of traction is not very great, but it should be maintained until callus has been thrown out, usually a matter of ten to fourteen days. The palmar portion of the splint should be moulded into the arches of the hand in order to preserve their contour and cut out freely about the thenar eminence to allow movement of the thumb." (Wilson and Cochane, p. 310.)

This traction may be used with cock-up, straight, or dorsiflexion position, or lateral extension as for the thumb. In making this splint, use ten or twelve gauge wire; the wrist should be well padded with saddler's felt or plenty of cotton wadding. Rubber bands for traction may be attached to the fingers either with lateral strips of adhesive plaster held with circular turns near the base or with Heusner's glue, which is made as follows:

A.	Resin (Powder)	50 grm.
	Alcohol	50 grm.
B.	Benzine	25 grm.
	Venice turpentine	25 grm.

Mix A and B.

METACARPAL FRACTURES

The first metacarpal bone is usually broken at or near the base and may be one of three kinds. First, those not involving the joint surface are usually impacted with shortening of the bone, and are caused by a blow on the end of the thumb. Second, the stave fracture of Bennett is an oblique fracture of the proximal end of the bone running through the base upward and backward, the upper end of the lower fragment being displaced upward and backward. This occurs only in adults. The third kind is the separation of the epiphyses from the shaft, the fracture extending into the shaft.

The symptoms are pain, swelling, deformity, tenderness, and crepitus, unless impaction has occurred. Extension in a banjo splint should be used for Bennett's fracture, and for all displaced fractures. Of all the fingers of the hand, the thumb is the most important and the hardest to get along without. For this reason, every effort should be made to get the best possible result in all thumb fractures. While extension treatment is agreed upon by all, there has been considerable discussion as to whether the thumb should be in the position of grasp, the most favorable position if a bad result follows and especially if motion is badly limited, or in marked abduction. Extension in abduction seems the position of choice for Bennett's stave fracture. For the other fractures, the fluoroscopic examination will usually be the guide; if in doubt put up in position of grasp.

Fractures of the shaft also occur and usually are the result of a direct blow. Shortening may result and is best determined by comparing the relation of its tip on the index finger with that of the other hand. Splinting the thumb in abduction may be tried; if that does not hold, use extension in abduction with the banjo splint.

Fractures of the other metacarpals may be at the base, in the shaft, or at the knuckle. Displacement may be absent or it may be very great. The great tendency in these fractures is for the distal end of the bone to drop, causing deformity of the knuckle line, and resulting in difficulty in flexing the fingers, and a weak grasping power. Both the longitudinal and transverse arches are impaired, and if the deformity is not corrected the lumbricale and interossei muscles cannot act normally in fixing the metacarpo-phalangeal joint; this in turn interferes with the long flexor tendon in flexing the terminal phalanges. With the fingers flexed, an examination of the knuckle line will usually show whether or not a fracture or dislocation with displacement exists, unless the swelling is very great. In such cases, an *x*-ray will show, and should always be taken. Very frequently several metacarpals are broken. Fractures of the shaft are usually due to direct violence. Knuckle fractures are usually the result of fighting. The fourth and fifth metacarpals are the ones usually affected. They consist of a break, usually oblique upward and backward just back of the expanded head. There may be apparent over-riding or impaction of the parts, but true impaction is not common.

The treatment of a broken metacarpal with no displacement is simple. All that is really needed is to keep the hand in a sling to prevent use of the hand. In most cases, however, a straight splint is advisable, as most patients will try to use their hand, and cause a later displacement, or delayed union. In displaced fractures, and this includes the great majority, reduction and retain-

ing in good position is very difficult. The method of flexing the fingers over a bandage roll and binding them with adhesive tape and a bandage is given in all the textbooks, but usually leaves a crooked bone and a dropped knuckle, with a weak grasping power. Extension after ether reduction gives the best result, and should usually be used. Straight extension should usually be used, sometimes hyperextension, and occasionally partial flexion. The fluoroscope will aid in determining the position. These bones require three to four weeks for union, and must be immobilized that long, and often longer. Start active motion of the fingers as early as possible. Heavy work should not be allowed for six weeks.

PHALANGEAL FRACTURES

Fractures of the phalangeal bones are of more frequent occurrence than those of the metacarpals, and require a great deal of care to get good results. Most finger fractures are the results of a direct blow, and consequently, may be in any part of the bones and range from a simple transverse fracture with no displacement, to a badly comminuted bone, with splinters pointing in various directions. Being superficial, these fractures are easily diagnosed, but an *x*-ray film gives more detailed information than palpation alone.

In a simple fracture without displacement, all that is needed is a tongue blade extending along the finger and, if it is the proximal phalanx, back onto the hand. This splint should be retained two to three weeks, at which time union should be present. Fractures with displacement must be reduced, and it is often difficult to hold them in good position and alignment. If reduction is easy, and there is not much tendency to become displaced, a simple splint such as a tongue blade, or a piece of tin or an aluminum splint is all that is needed. But in many broken fingers, especially when comminuted, a splint is not effective, and extension is required. For this, a small banjo extension splint is the most effective, and the most comfortable to wear. A small wire extension splint having its base in the form of a saddle, which rides on the web on each side of the finger is efficient, but usually painful to wear, even when well padded. Extension should be continued two to three weeks. Extension may be made with adhesive tape along the sides of the finger, or with a glove finger attached with Heusner's glue. In some cases, a hole drilled through the finger nail, through which a piece of silk is threaded, will be more satisfactory, or direct skeletal traction may be needed, and can be obtained by passing a stout needle through the terminal phalanx.

Another form of finger fracture that is often seen is the mallet or baseball finger, in which the end of the finger is struck, leaving a flexed terminal phalanx, which can be extended by passive but not by active motion. In these cases there is usually an extensor ligament torn loose by flexion being forced against the resistance of the extensor tendon, or the piece of bone to which the extensor tendon is attached has been torn off by avulsion. The best treatment is hyperextension of the terminal phalanx, using a palmar splint bent upward near its end at a forty-five degree angle.

As free motion is the most important function of the fingers, active motion of the fingers must be started as early as possible. Early movement of the fingers should always be active, produced voluntarily by the patient flexing and extending his muscles himself, and never by an attendant. In most fractures, after a short period of complete immobilization, retention or extension splints may be removed daily to allow the patient to actively move his fingers. Care and supervision should be used to prevent displacement. If done carefully the period of disability can be shortened very considerably.

Compound fractures of the fingers are frequent, and are often very severe. The blood and nerve supply, however, is so abundant that one should never amputate, except in very exceptional cases, until after several days have elapsed to be sure that repair is impossible; sometimes seemingly hopeless cases result in useful fingers. This is especially true of the thumb. Even a stiff, immobile, weak, and deformed thumb is better than none, and a surprising amount of grasping power is possible with only a stump of a thumb. A few days waiting will cause no damage, but a finger that has been amputated can never be replaced. The reparative power of the fingers is wonderful, and this is especially true in children and youths. Fingers in children that are nearly severed will sometimes grow and become useful. Even in adults, fingers that are so badly crushed that repair seems impossible at

first examination will sometimes heal and become serviceable. A smashed joint may be debrided, and soft tissue transplanted into the space between the bone ends and a new mobile joint formed. Tendons can be sutured at the time of repair or later. In some cases, tendon transplant may be needed. Skin transplants and skin flaps may be needed to cover denuded areas, or an end that has been cut off. Even a bone graft may sometimes be needed to fill in crushed bone. To get good results the wound must be kept clean and free from serious infection. A badly infected finger is hard to save, and seldom becomes useful, unless it be the thumb. But it is so easy to amputate later, if a badly deformed or stiff finger results, that conservative efforts should always be tried, unless gangrene develops; and even then save all that shows any possibility of being useful. In severe multiple injuries of the fingers, it is sometimes advisable to allow the gangrenous parts to almost slough off so as to save every bit of finger possible; and then cover the ends with skin graft or flap, or even allow them to heal by granulation. It is surprising what satisfactory stumps occasionally follow this method, unscientific as it may sound. The treatment that is best is that which will give the most useful hand.

In conclusion, I wish to emphasize the following points:

1. Injuries of the wrist are very deceptive, and a fracture or dislocation is easily missed.
2. Fractures of the hand, and the hand includes the wrist and fingers, are serious fractures.
3. The large number of poor results in these fractures indicate that more care and attention should be given these injuries than has been done in the past.
4. Maintaining the normal arches of the hand is necessary for good function.
5. Use conservative treatment in severe injuries of the fingers.

FRACTURES OF THE WRIST*

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MANY years ago there must have been an elderly female who, having fallen on her outstretched hand, received such an injury that she could not move her fingers. Later, discovering that her wrist was broken, she must have decided that if one broke a wrist one could not move the fingers of this hand. Arguing conversely, if the fingers could be moved, the wrist was not broken. This myth has been handed down for generations. Many fractures are therefore missed because the fingers move and to the lay eye there is no obvious break. Darrack must have had a similar situation in mind when he said, "Anyone who has fallen on an outstretched hand or experienced a backfire while cranking a car, and who has localized tenderness over the lower end of the radius, with some disability of the wrist, may be considered to have a fracture of the wrist until it is proved otherwise."

In this presentation I have no new method of discovering all of these common fractures, nor having discovered a fair proportion have I any panacea that will insure one hundred per cent cures. My endeavor is to review the generally accepted procedures that have proven satisfactory. By means of lantern slides I wish first to show certain normal relationships which are important in making a diagnosis and, later, in determining the efficiency of the reduction; second, to show various types which may be encountered; third, to give a brief discussion of diagnosis; and, fourth, to discuss treatment.

It is not necessary to point out that the styloid process of the radius is on a lower level than that of the ulna. Less obvious is the fact that the articulating surface of the radius is also slightly lower than the corresponding portion of the ulna. Remembering this will aid in determining whether the normal relation has been restored between the radius and the ulna at their lower articulation after reduction. Restoring this articulation is of great importance, for without the smooth gliding surface of the former position there will be persisting pain on rotation. If one were to draw a line through the anteroposterior plane of the lower articulation of the radius, it would make approximately a right angle with the shaft of this bone. After fracture, the restoration of this angle means the correction of any tilting of the lower fragment, thereby insuring the path for normal extension and flexion.

Two further anatomic shadows, that at times may tend to confuse the picture, must be pointed out. The lower end of the radius dips downward or toward the ventral surface of the wrist rather abruptly. It is easy to interpret this as a displacement. The other shadow is made by the ulna which, in a truly lateral view, is superimposed upon the radius. The difficulty arising from this double picture may be obviated by identifying each cortex at a higher level in the forearm and following it to its lower extremity.

Turning to the types usually seen, the common Colles fracture may be a simple transverse break from one-half to one and a half inches above the lower end of the radius. The distal fragment may be displaced dorsally. Impaction may or may not exist. If the dorsal surface alone is impacted, the angle of the articulation with the shaft becomes acute dorsally. If the lower cortex alone is impacted, the dorsal angle becomes obtuse and we have a reverse Colles. The Colles fracture may also exist with varying degrees of comminution and displacement.

The so-called backfire fractures resulting from the back-kick of a motor frequently show a single transverse line of fracture beginning directly in the joint surface near the ulna and extending toward the radial side of the wrist, as though the styloid and a part of the lower end of the radius were sliced or split off, or the carpal scaphoid acting as a wedge splits off the styloid. Often there is no displacement. These may be readily missed without the *x*-ray. Not all, however, are thus simple. Great comminution may simulate a bag of gravel.

Diagnosis may be simple if the classical "silver

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fork" deformity is evident. If seen early there may be a typical localized swelling over the carpal area, but this is soon overshadowed by diffuse edema of the hand, wrist and lower arm. When the styloid of the radius is higher than that of the ulna, the evidence is convincing. It is well, of course, to compare with the sound wrist, as an anatomic variation may exist. Point tenderness is very important, as is crepitus when elicited, but no great effort should be expended to produce the latter. Otherwise comminution may thereby be increased. *X*-ray is the final evidence and should always be resorted to, even though a fracture is obvious. The aid thereby afforded in determining the maneuver of reduction is invaluable.

I believe that it is impossible to reiterate too frequently the need for early treatment once the diagnosis is established. In the event of much swelling, which is the usually advanced excuse for delay, the statement stands. Reduction is the quickest way of reducing swelling; it lessens hemorrhage from the bone ends, and makes more room for venous return.

The type of maneuver employed to accomplish reduction is unimportant so long as four things are achieved: First, the thorough breaking up of the impaction before attempting any replacement; second, the overcoming of any tilting of the lower fragment; third, the restoration of the normally lower articulation of the radius; and, fourth, the re-establishment of the articulation between the ulna and the radius. With these four steps accomplished, the next necessity is the maintenance of reduction. Here again the type of immobilizing device may vary with the individual. Some may use a plaster cast, others a molded plaster splint, and still others a metal splint. Perhaps one of the simplest and at the same time efficient methods is the use of the basswood splint. These splints are shaped to maintain ulnar deviation of the hand; they are cut out above the ulnar styloid, are well padded, and held in place with adhesive and bandage; they are easily removable for massage and heat.

The after-care demands adequate physiotherapy. The posterior splint may be removed after a few days and heat, combined with light massage, should be instituted. After this treatment, of course, the posterior splint is reapplied. If there is no marked tendency to recurrence, active motion may be started at the end of a week, for a short period. Where much comminution is present and there is a tendency for a recurrence of the deformity, I believe that immobilization should be undisturbed during the first ten days or two weeks. A leather wristlet may be substituted for the wooden splint after three or four weeks.

To recapitulate: Certain anatomic relations must be remembered in determining the diagnosis, the method of reduction, and in interpreting the efficiency of the reduction. *X*-ray clinches the diagnosis and should always precede reduction, even though fracture is obvious. In treatment there should be no delay. The important technical steps are thorough freeing of any impaction, correction of tilting of the lower fragment, correction of shortening of the radius, and the re-establishment of the lower radial ulnar articulation. In the after-care physiotherapy is all-important.

FRACTURES OF THE LOWER END OF THE HUMERUS*

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IT is proposed in this necessarily brief survey of fractures around the elbow joint to limit the discussion to those involving the lower end of the humerus, for these are of course the most important as they greatly outnumber fractures of the upper end of the ulna and radius. To understand and treat these fractures properly it is absolutely necessary that the structure of the parts involved be thoroughly understood.

The lower end of the humerus flattens out in an antero-posterior direction and broadens out toward the two sides, the supracondylar ridges on the sides of the lower end of the shaft running down to terminate in the internal and external epicondyles respectively. The extremity of the bone is furnished with two articular surfaces, the capitellum and the trochlea, the former being a rounded eminence to articulate with the head of the radius and the trochlea a grooved surface with prominent edges in which the ulna articulates with the humerus. These, with the epicondyles, form the condyles and are placed at an angle of about 85 degrees with the shaft, thus accounting for about one-half of the carrying angle of the elbow, the other half being, of course, due to obliquity on the ulnar side of the joint. Viewed from the side, the lower end of the humerus is club-shaped and inclined forward so that in adult life about two-thirds of this end lies anterior to a line bisecting the shaft of the bone, while in children up to nine or ten years of age the entire capitellum lies anterior to this line. Just above the capitellum and trochlea anteriorly are the radial and coronoid fossæ and posteriorly, opposite to these, is the olecranon fossa. The capsule of the elbow joint is attached anteriorly just above the articular margin but posteriorly it is continued upward so as to enevelope the olecranon fossa. On the sides it is attached near the bases of the epicondyles. The external epicondyle is the site of the origin of the common tendon of the extensor muscles of the forearm, while on the internal epicondyle is found the origin of the common tendon of the flexor muscles and the pronator radii teres. The ulnar nerve runs in a groove on the posterior surface of the internal epicondyle and is in close relation to the bone at this point.

Ossification of the lower extremity of the humerus develops from four centers, the first to appear being that for the capitellum during the second and third year. Extending upwards this center forms the outer half of the trochlear surface, the center for the inner half not appearing until the tenth or twelfth year. The center for the internal epicondyle appears about the fifth year while that for the external epicondyle is not present until the twelfth or fourteenth year, when it rapidly joins the capitellar center. The internal epicondyle unites as a rule separately to the diaphysis, while the other three centers form the lower epiphysis. This unites to the shaft during the sixteenth to seventeenth years but sometimes earlier.

The fractures of the lower extremity of the humerus may be divided into: Supracondylar, transverse dicondylar, those of the external and internal condyles, "T" or "Y" fractures (the so-called intercondylar), epicondylar and epiphyseal separations.

The supracondylar fractures are the common elbow fractures in children and are due either to: (1) a fall on the outstretched hand; (2) less commonly, a fall on the point of the flexed elbow; (3) more direct injury with the elbow extended. With these fractures there is always more or less displacement of the distal fragment. Following falls on the outstretched hand occurs the so-called "extension type" of fracture with the distal fragment displaced backward and the line of fracture oblique, running downwards and forwards. In the less common type due to falls on the flexed elbow we encounter the "flexion type" of fracture with the obliquity in the opposite direction and the fragment displaced forward. This latter fracture is the usual one in adults while the former is the common one in children. In both types of fracture the periosteum is frequently stripped for some distance from the shaft of the bone and the fragment

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rotated inwardly and displaced to the lateral side. This displacement of the fragment is due to the fracturing force, the direction of the line of fracture, and the pull of the biceps, triceps and brachialis anticus. Supracondylar fractures are never impacted and usually cause some distortion of the carrying angle. Although nerve injuries are not the rule with this type of fracture the radial, and, less commonly, the median nerve may be involved and for this reason an examination should always be made for such injuries before any treatment is undertaken. The pulse and circulation should also be investigated on account of the liability to injury of the adjacent blood vessels. Although Volkman's contracture can not be discussed here it is an ever present danger in these cases and must always be kept in mind.

With transverse dicondylar fractures we find that the etiology is practically the same as for the supracondylar type, especially a fall on the extensor surface of the forearm. With this fracture there is a transverse line passing through the olecranon fossa which of course makes the fracture intra-articular and causes a hemarthrosis. The displacement of the fragment is usually slight but may be in any direction and the fragment also may become impacted.

Fractures of the external condyle, which are more frequent than those of the internal condyle, are due to a fall on the hand with the force directed upwards through the radius to the capitellum or to a fall on the inner aspect of the olecranon with the elbow flexed and the force transmitted outward to the external condyle. More rarely this fracture may be caused by direct injury to the outer side of the elbow and extended forearm with the pulling off of the external condyle through action of the external lateral ligament. In this fracture the line passes obliquely upward, separating as one piece the capitellum, the outer edge of the trochlea, and the external epicondyle from the rest of the bone. The fracture is rarely impacted and the fragment is usually displaced upward, outward and forward and is frequently rotated. As the result of the displacement there is a distortion of the joint line and an irregularity of the joint surface and therefore a change in the joint axis and carrying angle. Of course this fracture is also intra-articular.

Fractures of the internal condyle are usually due to direct violence such as a fall on the flexed elbow, the force being transmitted through the olecranon to the internal condyle. This fracture also sometimes accompanies posterior dislocation of the elbow. The line of fracture runs from the center of the trochlea obliquely upward to above the internal epicondyle. The fragment may be displaced in the same general way as the external condyle in its fractures and this displacement leads of course to a loss of the carrying angle.

"T" or "Y" fractures are due usually to falls on the point of the elbow with the ulna driven upward into the trochlea as a wedge separating the condyles. The fractures may also be caused by the shaft of the humerus being driven down between the condyles after a supracondylar fracture has occurred. A direct crushing or twisting force at the elbow may of course also cause this type of lesion. These fractures are distinctly an adult injury and are only rarely found in children. The damage is very great as the condyles are broken off and frequently comminuted. There it is no typical displacement of the fragments but they may be rotated or twisted out of place in any direction. There is always a marked disruption of the elbow joint and frequently marked involvement of the soft parts.

Fractures of the epicondyles, both internal and external, are due to direct injury or to hyper-abduction or hyper-adduction of the elbow joint. Fractures of the internal epicondyle are the more common, but, as displacement of the fragments is never great, the lesions are not important. With involvement of the external epicondyle the line of fracture may be intra-articular, as the capsule is inserted well up towards its apex.

Epiphyseal separations may occur up to the time of their union with the shaft but there is no typical displacement and they are relatively unimportant. Etiologically they are due to the direct or indirect forces mentioned under the various fractures. The capitellum may alone become detached at times with marked displacement even up to complete rotation. This latter lesion is one of the common causes of delayed ulnar nerve palsy.

The rare fractures of the lower end of the humerus are those of the trochlea and capitellum. On account of this rarity no extended discussion of them is necessary.

The diagnosis of the various types of fractures

of the lower end of the humerus may not be difficult if the cases are seen early before any marked swelling has masked the findings. The distortion of the joint, the change in the carrying angle and the points of tenderness are the important factors. The radiograph of course gives one the final accurate diagnosis and all cases should be examined with the *x*-ray taken in at least two planes.

The treatment of fractures of the lower end of the humerus involving the elbow must be directed toward the restoration of the normal anatomy with special attention to the preservation of the clubbing of the lower end of the bone and the carrying angle. To accomplish the proper result the fragments must first be reduced and then a dressing applied which will hold them in the right position while healing is taking place. With supracondylar and transverse dicondylar fractures and with the epiphyseal separations reduction must practically always be made under an anesthetic. With the fragment displaced posteriorly the manipulation should consist of traction, hyper-extension of the elbow with angulation at the site of fracture, slipping forward of the fragment and then acute flexion of the elbow to draw the fragment into proper alignment by the tightening of the triceps tendon. The taut tendon will then hold the fragment in position. If this procedure can be done under the fluoroscope the replacement of the fragment can be more accuratly determined but this fluoroscopic examination is much more important where the fragment has been displaced anteriorly. Rarely open operation with reduction of the fragment and internal fixation is necessary. If the forearm is accurately flexed into such a position that it lies directly on the arm the carrying angle is preserved and no marked deformity of the elbow can result. The position of acute flexion should be the one of choice for all the fractures mentioned unless there is some distinct contra-indication as shown by interference with the circulation or displacement of the fragment. To hold the arm in this position there are several types of dressings which can be used. The most common of these are: (1) hyperflexion bandage of Ashhurst with the wrist tied to the neck; (2) the lateral hyperflexion plaster-of-Paris dressing; (3) the posterior moulded plaster-of-Paris splint with fixation of the shoulder if necessary; (4) the collar and cuff attachment of Jones; and (5) adhesive plaster strapping. These dressings should be kept on for about three weeks in children and four weeks in adults, after which a simple collar and cuff or ordinary arm sling can be used for from one to two weeks with the elbow carried around a right angle. In simple cases with good reduction careful active motion can be started in ten days to two weeks, although with the less satisfactory and comminuted cases this time must be lengthened. Massage and baking can be started when consolidation is sufficient to allow their use. With the transverse dicondylar fractures the period of fixation must be slightly lengthened (about four weeks in children and five weeks in adults) and active motion delayed to the third or fourth week.

Fractures of the internal and external condyles call for operative interference more often than supracondylar or transverse dicondylar fractures but otherwise their reduction and retention follows along the same lines as those just outlined.

Fractures of the epicondyles need no reduction as a rule and the simple moulded splint or body swathe with the elbow in acute flexion is all that is necessary for fixation. Gentle motion can usually be started during the first week but the fixation should continue for about three weeks.

The reduction of "T" or "Y" fractures is sometimes extremely difficult or even impossible. The same general procedure as for supracondylar fractures with moulding of the condyles together by lateral pressure is sometimes sufficient, especially if the work is done under the fluoroscope. Where reduction can not be accomplished by this method, bed traction with the elbow at a right angle may be tried but open reduction of the fragments with internal fixation is frequently necessary. After reduction of these fractures the arm should be dressed in acute flexion if possible, provided this position does not cause a distortion of the fragments. The posterior moulded plaster-of-Paris splint is probably as satisfactory as any retentive dressing for this condition. The fixation dressing should be kept on for from four to six weeks although this time may be slightly lessened in operative cases where the reduction is good. After removal of the retention dressing the arm should be kept in

a sling for from two to three weeks and the massage and active motion, which should be started in from three to four weeks after the injury, continued during this time.

The rare fractures of the capitellum and trochlea can be treated in general the same as the transverse dicondylar fractures but operative reduction or removal of the fragments must always be considered.

To sum up this subject of fractures of the lower end of the humerus the following points should be reëmphasized:

1. Accurate knowledge of the anatomy of the parts is essential.

2. The diagnosis should be made by the clinical findings plus the radiograph taken in at least two planes.

3. Reduction of the fragments should be accomplished conservatively if possible but open operation is necessary if proper alignment is not obtained.

4. Fixation should always be with the elbow joint in acute flexion if possible, not only for the purpose of retention of the fragments but also to give the joint the best possible chance for maximum function.

5. Active motion should be started early with baking and massage when possible. Passive motion has no place in the treatment of these fractures and is absolutely contra-indicated.

FRACTURES OF THE OS CALCIS*

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OF ALL fractures below the astragalo-tibial articulation, fractures of the os calcis are the most disabling.

Not only damage to bone, with resulting change in shape, size and position of the os calcis, but also exostoses, spurs, deformity, damage to joint surfaces with marked and painful limitation of motion of the foot, damage to soft parts, bursæ, nerves and vessels, may individually or collectively be of such serious consequence as to permanently disable the individual from such labor as requires use of or standing on the feet.

Fractures of the os calcis usually come from direct injury, as blows or falls upon the heel. The force is transmitted directly to the os calcis, which, as a result of the sudden and severe external force, may be compressed, shattered, comminuted, or split in two or more pieces, with the extra complication of having the fracture compound.

Again, there may be no evidence of fracture in the os calcis but a decided change in the shape and position of the astragalo-calcaneal and the calcaneal-cuboid joints.

Avulsion of the heel, or os calcis, comes from a shearing force in which the portion of the os calcis is fractured or cut off, and is rarely associated with change in the surrounding joints.

Because of the unusual joint changes associated with fracture of the os calcis, it is well to remember the motion of the various joints of the foot. The astragalo-tibial has only the motion of flexion and extension. The calcaneo-astragaloid joint permits principally side to side motion and a slight gliding of the os calcis backward and forward on the astragalus. The astragalo-scaphoid joint is an arthrodial joint with considerable mobility in all directions. The calcaneal-cuboid joint permits only a slight gliding motion.

We must bear in mind that all motion of rotation of the foot is accompanied by the subastragalar joints, and these are the joints that are most frequently injured by fractures of the os calcis.

It has been my observation that greater disability in fractures of the os calcis comes from damage to joints in change of shape and position than from actual change in shape and size of the os calcis, although pain and disability may be suffered because of exostosis on the plantar surface of the os calcis and because of actual widening of the os calcis by compression with continued pressure on the external peroneal nerves and vessels.

The orthopedic surgeon treats the acute fracture rarely in comparison to the number of times he treats end-results, and it is my opinion, while a certain disability from this serious type of injury cannot always be prevented, a better prognosis could be given if the usual measures of treatment now in vogue were faithfully carried out, and as an end-result, instead of 30 to 50 per cent disability of function of the foot, the final disability could be reduced by at least half of that estimate.

I support this theory because of the frequent history given in the disabled case. We frequently find that there has been an absence of *x*-ray examination. This fracture is often treated as a sprained ankle with simple bandaging. Again, a short inefficient plaster or splint has been worn for a short period with no efficient after-care and the real diagnosis made weeks after the injury because of the continued disability. These points stand out clearly as the definite causes of disability in this type of fracture.

Treatment of os calcis fracture can be considered only after a suitable *x*-ray examination has been made. For successful treatment it is necessary to know the type of damage, that is: is the fracture compressed or comminuted; is it a linear fracture, single or multiple, complete or incomplete; or is it a simple impaction between the astragalus and os calcis?

In every case anesthesia is necessary, if manipulation is to be considered. In all cases impaction between the astragalus and os calcis

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must be broken up so that lateral motion of the foot is free.

A compressed type of fracture requires molding and manipulation of the os calcis into its former shape, and usually is accomplished by the use of a mallet or a Thomas wrench, applying the force directly to the os calcis, which has been covered and protected by felt padding. A large engineer's wrench, in the absence of a Thomas wrench, will accomplish the desired end-result by first rocking the os calcis loose, then applying great power to both sides of the os calcis until a suitable contour is obtained. The carpenter's mallet will accomplish the same results, but the force used is less certain and less reliable.

After manipulation of the os calcis the foot is held in slight inversion, slightly below a right angle, with the arch well restored, and a plaster dressing is applied from the base of the toes well above the knee joint, with the knee flexed at a right angle so that all pull of the tendo Achilles has disappeared. The cast is cut on both sides and remains intact for some two weeks, when after-treatment is begun.

Transverse fractures, linear fractures with separation, require, first, a breaking up of all impaction with pulling and retaining of the fragments in place. The Thomas wrench is very useful in breaking up the impaction; the ice tongs or ice pick or Steinman pin is inserted just above the os calcis, anterior to the tendo achillis, and sufficient force is used to pull the fragments in place. The pin, or ice pick, may be incorporated into the plaster dressing and left in place for the first two or three weeks. It may be occasionally necessary to lengthen the tendo achillis in this type of fracture, but flexion of the knee to a right angle, in the greater number of instances, relaxes the tendo achillis sufficiently, with the holding of the foot in slight equinus, so that it is unnecessary to lengthen the tendon. It is necessary, again, to be sure that the conformation of the heel has been restored, the arch restored, and the foot held in very slight equinus and inversion. It is not infrequent that both compression and linear fractures are present, and in this type of case both remodeling and traction, to reduce the fracture, are necessary.

After-treatment: The foot is held at rest for approximately two weeks in a bivalved cast. At the end of this time the cast is removed daily for baking, massage and gentle motion. This continues for at least four or five weeks, with no weight-bearing, for approximately eight weeks from the time of injury. At this time the wedged shoe, or the shoe with a side-iron brace, is used for support, with a fairly heavy arch in the shoe composed of felt, leather or sponge rubber. The side-iron brace is of great value when weight-bearing is first begun, as it prevents the lateral motion of the foot and the individual may return to work many weeks earlier when this type of support is used.

It is my opinion that in the average case, and under average surroundings, these rather simpler procedures should be advised at first. If, however, there is a question, after suitable *x*-ray pictures have been made, as to the complete restoration of the os calcis, either in recent or old fractures, because of the attending disability, subastragalar arthrodesis should be advised.

Subastragalar arthrodesis has in the past been used in the older type of case. However, because of the reduction of disability as the end-result, giving a stable, painless foot, the operation should be advised much more frequently.

The Cotton operation, for the removal of the distorted compressed portion of the os calcis, when it presses against the external malleolus, can easily be done at the same time, if necessary; and if operation is to be advised in these cases, I feel that the operation of subastragalar arthrodesis will reduce disability and give a foot that is painless with some limitation of motion, but permit the individual to return to his former occupation in the greater number of instances.

CAUSES OF DELAYED UNION OF BONES*

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IN THIS age of rapid transportation, increasing industrialization of the country and the employment of so much machinery on farms, fractures are becoming more common, and physicians in general practice are called on more and more to take care of fractures of all kinds, many of which are of the severe type previously seen only in the larger industrial centers.

When a fracture is delayed in uniting, much concern is caused to the patient, his friends, and not least to the surgeon in charge. Therefore, a brief discussion of this condition is in order in a symposium of this type. The causes may be divided into two types: systemic and local.

SYSTEMIC CAUSES

Usually delayed union is seen in rugged, healthy men in the active period of life, and in the most careful examination it is rare that any abnormality of a general character is found. Syphilis is often mentioned as a cause of delayed union, but in my experience there have been only two cases in which I thought syphilis might have something to do with delayed union. Not infrequently multiple fractures (oftentimes as many as thirty or forty) in cases of fragilitas osseum in sickly, fragile children with blue sclerotics heal rapidly, in a shorter time than would be expected in a normal person. Of recent years the theory has been advanced, chiefly by Petersen of Johns Hopkins Hospital, that the calcium content and phosphorus content of the blood are concerned with the causes of delayed union and nonunion. Following the work of Howland and Kramer on rickets, Petersen took into consideration the amount of phosphorus and calcium in the blood of patients with fractures. In rickets Howland and Kramer showed that if the product of calcium and phosphorus, obtained by multiplying the number of milligrams of calcium by the number of milligrams of phosphorus in 100 c.c. of blood, fell below 30, the rickets would not heal, and if it rose to above 35, the rickets would rapidly disappear. The normal calcium content of the blood is estimated at 10 mg. for each 100 c.c., and the phosphorus content at 3.5 mg. for each 100 c.c. The product of these two quantities is 35 and is taken as the normal standard. Petersen tried to apply this principle to fractures, claiming that if the product fell below 30, union would not take place, and that if it fell below 35, delayed union might occur. The same tests were carefully carried out in The Mayo Clinic[1] but it was not possible to corroborate these data. Most certainly there was no evidence in the cases of delayed union and nonunion that were examined that the calcium content and phosphorus content of the blood were below normal. Therefore, I believe I may dismiss from the discussion any further consideration of systemic causes.

LOCAL CAUSES

Local causes may be divided into two types, physiologic and mechanical. Physiologic local causes concern the condition of the tissues surrounding the ends of bone at the site of fracture, and their physiologic reaction to trauma. Of 231 cases of delayed union and nonunion reviewed in 1925, I found that 118 followed severe contusing traumatizing injuries, such as a forearm caught in a belt and severely twisted, or a leg run over by a heavy truck. There has been some experimental work carried on comparatively recently that seems to me to have a bearing on this subject, and although the views that I am about to advance are more or less theoretic, to my mind they are interesting and I present them for what they are worth.

It is known that if normal bone is put in an amino-acid solution, such as glycocholic acid, within a comparatively few days as much as 20 per cent of the calcium is withdrawn from the bone. When tissue is injured and slough takes place, and when hemorrhage takes place within the muscles to form a hematoma, absorption of the devitalized tissue and the hematoma occurs. During this process, amino acids are formed, particularly glycocholic acid. Thus, the ends of

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the bone in a fracture, being bathed in this amino-acid fluid, may be decalcified. Of interest, also, has been the work done by Robison and his associates in the Lister Institute in London on the physiology of bone. They reported the presence of an enzyme found in the ossifying cartilage, in growing bone, in the teeth of young animals, and in the kidney. This enzyme, according to these workers, acts on the phosphoric esters of the blood, hydrolyzes them and liberates phosphate ions. These unite with calcium to form calcium phosphate. Schwarz and his co-workers in Germany repeated this work and claimed that this enzyme was inactive in the presence of an acid solution. Therefore, there would be an inhibitory action placed on this enzyme in an acid medium such as would be found at the site of fracture during the absorption of a hematoma or devitalized tissue. We would, therefore, have two factors unfavorable to bone formation: (1) decalcification of the ends of bones due to being bathed in an animo-acid medium, and (2) the tendency of the amino-acid medium to inhibit the action of the enzyme. Furthermore, it is well known that severe traumatizing injuries tend to delay the normal healing and repair of tissues.

Of mechanical causes there are many that might be mentioned. Marked malposition of the fragments with, not infrequently, intervention of muscles between the ends of the bone is perhaps the chief of the local mechanical causes for the presence of delayed union or nonunion. Inadequate fixation is also a prominent factor. The mechanics necessary to control the fragments of bone are generally simple, but it is regrettable that one so often sees an almost total disregard for these simple mechanical principles in the treatment of fractures. Injury to the blood supply is also important. Once delayed union is present, all are deeply concerned, and oftentimes meddlesome inspections are carried out; many consultations are often held and the leg or arm is taken out and moved around to see if motion is present at the site of fracture. It would be far better, when delayed union is known to be present, to put the extremity back at rest and keep it there for four, five or six weeks. In certain situations, particularly where there are two bones, as in the leg and forearm, one bone may unite readily, a little absorption take place in the other bone at the site of fracture so that there is shortening, and the united bone then acts as a pivot around which swing the fragments of the other. This, I am convinced, is not infrequently the cause of nonunion of the tibia and the radius. The use of metal is sometimes charged with being the cause of delayed union or nonunion. It is quite likely that the presence of metal has a slightly inhibitory action on the physiologic repair of bone, but I believe the metal is to be blamed only if the mechanics governing the operation are poor. Although it is better not to use metal in the treatment of fractures, under certain conditions it should be used and when properly used it has little if anything to do with delayed union or nonunion. It must be remembered that there is a definite group of cases wherein it cannot be explained why the fractures do not unite, and in such cases the local physiologic causes that I mentioned may be a factor. At any rate, cases of this type display physiologic inertia and fail to respond until by some means the reparative properties of bone are awakened; this is usually best done by an open operation and the application of a bone graft with the necessary careful regard to technic governing the use of bone grafts.

SUMMARY

The causes of nonunion may be classified as systemic and local.

The systemic causes are rarely of any significance. Attempts to attribute the failure of bones to unite to a disturbed ratio of calcium and phosphorus have not been convincing. Experience with the carrying out of determinations of calcium and phosphorus in cases of delayed union and nonunion indicated that this theory was not sound.

The local causes may be divided into physiologic and mechanical. The physiologic causes mentioned offer an explanation of some of the baffling cases which are occasionally seen. The local mechanical causes are by long odds the most common, and explain the vast majority of the cases of delayed union.

BIBLIOGRAPHY

1. Henderson, M. S., Noble, T. P., and Sandiford, Kathleen: Ununited fractures with special reference to the chemistry of the blood. Jour. Bone and Joint Surg., 1926, xxiv, 607-617.

2. Howland, John, and Kramer, Benjamin: Calcium and phosphorus in the serum in relation to rickets. Am. Jour. Dis. Child., 1921, xxii, 105-119.
3. Howland, John, and Kramer, Benjamin: Factors which determine the concentration of calcium and of inorganic phosphorus in the blood serum of rats. Johns Hopkins Hosp. Bull., 1922, xxxiii, 313-317.
4. Howland, John, and Kramer, Benjamin: Factors concerned in the calcification of bone. Tr. Am. Pediat. Soc., 1922, xxxiv, 204-208.
5. Petersen, H. A.: A clinical study of ununited fractures with special reference to the inorganic bone-forming elements in the blood serum. Jour. Bone and Joint Surg., 1924, xxii, 885-901.
6. Robison, Robert: The possible significance of hexosephosphoric esters in ossification. Biochem. Jour., 1923, xvii, 286-293.
7. Schwarz, R., Eden, R., and Herrmann, E.: Über die chemischen Vorgänge bei der Frakturheilung und deren Beeinflussung. Biochem. Ztschr., 1924, cxlix, 100-108.

GLUCO-DEXTRIN NO. 1, GLUCO-DEXTRIN NO. 2 AND GLUCO-DEXTRIN NO. 3 NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that Gluco-Dextrin No. 1, stated to be "Dextrose 45.75 per cent, Dextrin 51.86 per cent, moisture Q. S.," Gluco-Dextrin No. 2, stated to be "Dextrose 39.50 per cent, Dextrin 45.61 per cent, Lactic Acid 12.50 per cent, moisture Q. S.," and Gluco-Dextrin No. 3, stated to be "Dextrose 45.75 per cent, Dextrin 51.86 per cent, Potassium Bicarbonate 2 per cent, moisture Q. S.," are marketed by the West Manufacturing Co. The first is apparently nothing more nor less than glucose U. S. P.; the second and third are apparently the same, with the addition of lactic acid U. S. P. and potassium bicarbonate, respectively. The Council points out that there appears to be no good reason why an official article and mixtures of official article should be marketed under these proprietary names. It calls attention to unwarranted claims that are made in the advertising for these products. The Council declared Gluco-Dextrin No. 1, Gluco-Dextrin No. 2 and Gluco-Dextrin No. 3 unacceptable for New and Non-official Remedies because the one is an official article and the others are mixtures of official articles marketed under proprietary names with unwarranted therapeutic claims. (Jour. A. M. A., July 13, 1929, p. 117.)

PHARMACEUTIC PREPARATIONS OF EPHEDRA NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry points out that during recent years much attention has been given to the alkaloid ephedrine and that the free base, ephedrine, and two salts, ephedrine hydrochloride and ephedrine sulphate, have been admitted to New and Non-official Remedies. Further, that the alkaloid ephedrine is one of the alkaloids contained in the drug ephedra (*Ephedra equisetina, ma huang*) which contains also an indefinite and variable mixture of bases related to ephedrine but differing quantitatively and possibly qualitatively in their actions. A chemical assay of pharmaceutic preparations of ephedra has, therefore, no value as a measure of their therapeutic potency, having no bearing on therapeutic activity. The Council holds the use of unstandardized preparations of a potent drug to be a step backward, and is distinctly undesirable when standardized preparations (in this case the isolated alkaloid ephedrine and its salts) are practically available. The Council therefore decided that pharmaceutic preparations of ephedra must be considered unacceptable until their therapeutic value in comparison to ephedrine has been established. (Jour. A. M. A., June 22, 1929, p. 2101.)

LOCAL ANESTHESIA IN THE REDUCTION OF FRACTURES*

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LOCAL infiltration anesthesia has been used in the reduction of fractures by many men. It has not, however, come into general use as much as could be desired, and it is for the purpose of demonstrating the value of this method in general practice, as well as in the specialty, that I wish to present this paper.

Conway,[2] in 1885, was the first to use local infiltration in fractures, and obtained good anesthesia by injecting cocaine into the fracture gap. Since that time, there have been others who have used the method, either by local infiltration of the fracture gap and the surrounding tissues, or by nerve conduction anesthesia. Prominent among these are Fulton,[4] Frostell,[5] Cohen,[3] Mage,[7] Muller,[8] and Farr.[6]

Böhler[1] has probably had more experience in the use of local anesthesia in fractures than anyone in this country or abroad. He has employed local infiltration in over 2,000 fractures. In his clinic, general anesthesia is the unusual procedure. He infiltrates a small quantity of procaine-epinephrin solution directly into the fracture gap, and uses it in all types of fractures.

INDICATIONS

In dealing with fractures, there are at the outset two features of primary importance, which it is desirable to accomplish, namely, the relief of pain and the reduction of the fracture.

If the pain is completely relieved, relaxation of the muscles will follow and reduction of the fracture is very markedly facilitated. The relief of pain may be brought about by the use of opiates, by a general anesthetic, or by a local anesthetic. Opiates will not completely relieve pain; a general anesthetic, though relieving the pain, will not produce complete relaxation of the muscles unless brought to the stage of surgical anesthesia, which is sometimes difficult to attain with the administration of nitrous oxide or ethylene. Relaxation of the muscles is obtained with local anesthesia, and this relaxation may be as complete as under surgical anesthesia.

No instance of infection following the use of local anesthesia in the reduction of fractures has been reported. No case of delayed healing attributable to this method of anesthesia has ever been recorded. It is evident, however, that this anesthesia should not be used in the presence of infection or in compound fractures.

Charles L. Scudder[10] has said that a fracture should usually be treated as an emergency and reduced immediately. If this procedure is carried out, I believe that the anesthesia will be more effective in producing relaxation of the muscles, for at this time the muscles and surrounding tissue will not usually have become too swollen, and most of the pain will be localized at the site of the fracture. If many hours elapse, or several days, it is evident that the surrounding muscles will become edematous and tender, and anesthesia at the site of the fracture will not produce relaxation. Anesthesia of all painful points, where muscles may have been bruised or their attachments torn, must then be accomplished before relaxation will be complete.

METHODS OF PROCEDURE

In a previous paper, I have described the technic used in infiltrating a fracture of the forearm.[9]

I use a 1 per cent procaine-ephinephrin solution. The amount used in any fracture varies from 10 c.c. to 60 c.c., depending upon where the fracture is located. In a Colles' or Pott's fracture, about 10 c.c. should be sufficient. In a fracture of the humerus or dislocation of the shoulder 40 c.c. should be adequate. In a fracture of the hip or femur, 60 c.c. will ordinarily be all that is required.

There is no single point of entry to a given bone or joint, but for convenience and for the sake of decreasing the liability of injury to nerves or blood vessels, I have arbitrarily elected certain points of entrance in each type of fracture or dislocation.

In the wrist or forearm, a dorsal puncture is made over the most superficial portion of the bone, 1 cm. proximal to the fracture gap, from

*From the Department of Surgery of the University of Minnesota. Presented in symposium before Minnesota State Medical Association, May 13, 1929.

which the fracture gap and the periosteum over the two dorsal surfaces of the bone are infiltrated; from a lateral or medial puncture, depending upon whether it is the radius or ulna, the periosteum over the ventral surface of the bone is infiltrated.

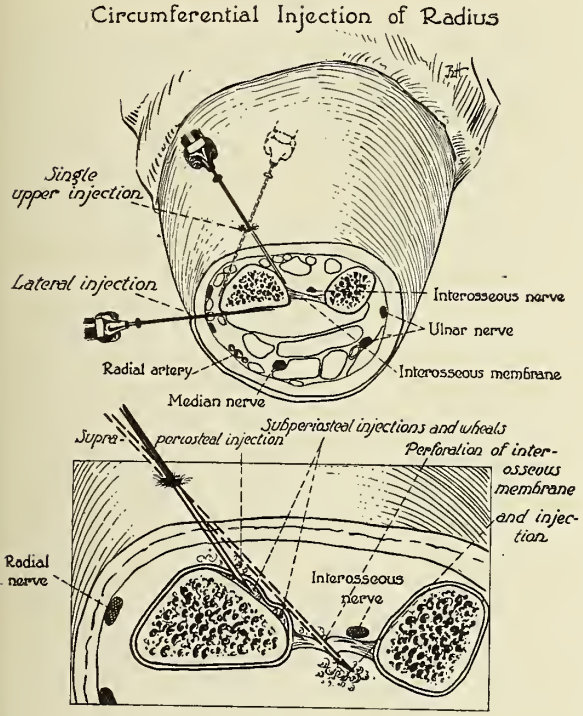

Fig. 1. Infiltration about three sides of the prismatic shaped radius. The insert diagrammatically represents the infiltration of the periosteum.

In a supracondylar fracture of the humerus or femur, a dorsal and a lateral puncture are made, infiltrating the two dorsal surfaces from the dorsal puncture, and the flat ventral surface from the lateral puncture.

For a dislocation of the shoulder, the approach is made through a puncture at the anterior edge of the acromio-clavicular articulation, directing the needle very slightly medially and posteriorly, so as to enter the joint capsule. Tender points, corresponding to the torn attachments of muscles, are also infiltrated if necessary. By using this fixed landmark, the distortion of the shoulder will not lead one to an erroneous infiltration.

By constantly infiltrating ahead of the needle, the pain associated with the process of infiltration is minimized. The needle is projected to the bone, usually over a ridge (Fig. 1), so that from one point two sides can be infiltrated. Since many bones are triangular on cross section, they can be completely circumscribed from two punctures.

Infiltration is made of the proximal fragment by piercing the periosteum (Fig. 2), and producing several sub-periosteal wheals, in this manner

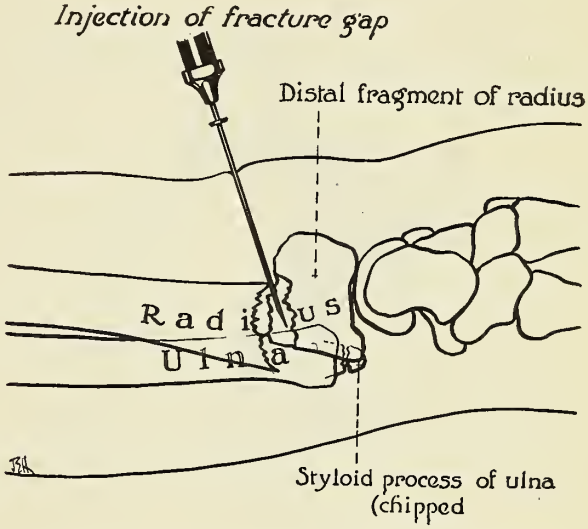

Fig. 2. Infiltration of the fracture gap. The presence of the needle within the fracture gap can be demonstrated by the aspiration of bloody fluid.

circumscribing the entire bone with a wheal of novocaine. The needle is then re-routed without being withdrawn, and directed into the fracture gap, where 5 to 6 c.c. is injected between the fragments. The distal fragment is not infiltrated. Anesthesia and relaxation are complete within 10 minutes after injection. Reduction and manipulation of the fragments can be accomplished painlessly and without undue force.

Whenever a manipulative procedure is necessary for the reduction of a fracture, I believe that this method of anesthesia can be employed to advantage. The fact that there are no untoward effects from this anesthesia makes it especially desirable.

The occasional need for remanipulation of the fragments, directly following reduction, when radiographic control shows inadequate reduction or improper alignment, is also a favorable feature of local anesthesia. Its simplicity and ease of applicability should make it especially favored in general practice. This method of anesthesia may also be used in fractures of the extremities where it is desired to use it merely for the convenience of manipulating a leg without producing pain

during the process of putting a fractured extremity into an apparatus.

I have used this method with complete satisfaction in more than seventy-five cases of fracture of the forearm, in one supracondular fracture of the humerus, one supracondylar fracture

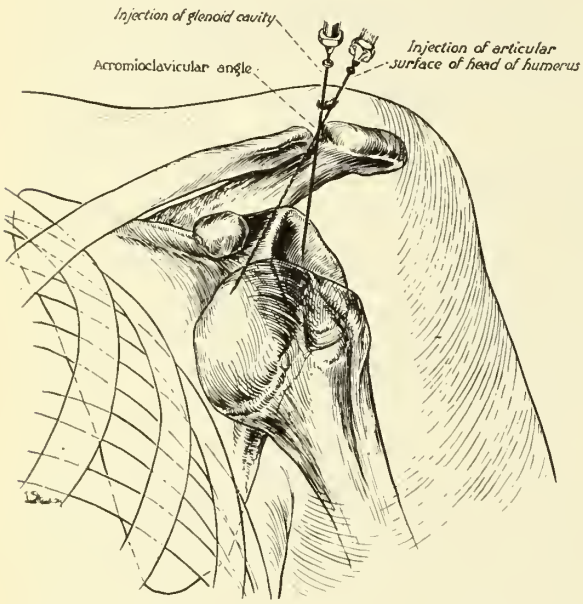

Fig. 3. Infiltration of the joint cavity; the needle is first directed into the glenoid fossa and then without being withdrawn is re-routed and directed to the disarticulated head. The needle is still within the joint capsule.

of the femur, two intracapsular fractures of the femur, four fractures of the leg, one dislocation of the shoulder, four fractures of the clavicle, three fractures of the phalanges, and one fracture of a metacarpal bone.

I recommend that this procedure be used more extensively in the reduction of fractures, for the purpose of alleviating pain and for the purpose of more easily obtaining satisfactory reduction of fractures.

BIBLIOGRAPHY

1. Böhler, L.: Die Funktionelle Bewegungs Behandlung der typischer Radiusbrücke. Münchener Med. Wchnschr., 70:387, March 30, 1923.
2. Conway, J. R.: Cocaine as an anesthetic in fractures and dislocations. New York Med. Jour., 42:632, Dec. 5, 1883.
3. Cohen, Ira: Local anesthesia in the reduction of fractures. Jour. Am. Med. Assn., 86:1896, June 19, 1926.
4. Fulton, A. A.: Local anesthesia in the reduction of fractures. Brit. Med. Jour., 2:796, Nov. 12, 1921.
5. Frostell, G.: Lokalanästhesie und Frakturbehandlung. Zentralbl. f. Chir., 52:1308, June 13, 1925.
6. Farr, R. E.: Local anesthesia. Lea and Febiger, 1923.
7. Mage, Sigmund: The use of regional anesthesia by nerve block method for the reduction of fractures and dislocations. Ann. Surg., 85:765, May, 1927.
8. Muller, W.: Significance of conduction anesthesia for the treatment of fractures and dislocations. Med. Klin., 22:327, Feb. 26, 1926.
9. Rice, Carl O.: Local anesthesia in the reduction of fractures of the lower forearm. Jour. Am. Med. Assn., 90:1768, June 2, 1928.
10. Scudder, Charles L.: Lecture delivered before a meeting of the American College of Surgeons in Minneapolis, March, 1929.

CARDIAC DECOMPENSATION AND ITS TREATMENT*

(Concluded)

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TREATMENT

Rest.—Prolonged, complete rest in bed is the most important therapeutic measure in heart disease. Rest is especially important where fever is present either from an active endocardial lesion or from any other source. Rest should mean not only limitation in motion but also the greatest possible comfort for the patient. A commode at the side of the bed often relieves the patient of a great deal of exertion expended in trying to use the bedpan, which is so hard for some patients. Occasionally one sees a patient with severe orthopnea made uncomfortable by being kept in a horizontal position because it is thought that such a posture involves less strain on the heart. The greater comfort in a semi-recumbent posture with a back-rest more than compensates for the small increase in heart work resulting from a more upright position.

Exercise.—Graduated exercise should be started after the patient has had a sufficiently prolonged rest to help build up the cardiac reserve. The increase in the time of sitting up should be very gradual, in minutes, and later the distance walked should be increased only by a few feet a day. The amount of exercise must always be kept well within the tolerance of the patient. As the condition improves the exercise becomes more and more a therapeutic measure in keeping the musculature of the body as well as of the heart in proper condition. However, all competitive games and all games necessitating violent exertion must be prohibited for all time.

Diet.—The diet should be simple and easy to masticate but not too restricted. Heavy meals should always be avoided so as not to overload the stomach, which may crowd against the heart. Irritating foods and foods that frequently produce gas, such as cabbage and beans, should be restricted. When edema is present, fluids should be limited to from 600 to 1,000 c.c. daily, depending on the condition of the patient. Salt should be reduced to a minimum when edema is present. Meat need not be restricted too greatly in the diet even in cases of essential hypertension. Spinach and other iron-containing vegetables are good, especially in cases with anemia.

Symptomatic Treatment.—Dyspnea. In severe dyspnea with cyanosis and distended cervical veins it is well to remove the cardiac load of increased venous pressure by immediate venesection. From 300 to 800 c.c. of blood should be removed. This often affords surprisingly great relief. If there is embarrassment to respiration from hydrothorax, hydropericardium or marked ascites, paracentesis should be performed, care being taken not to remove too much during the first aspiration.

Insomnia.—As far as possible patients should be given opportunity to obtain rest and quiet. The various drugs on the market such as bromides, chloral, allonal, dial, cibalgine, veronal, phanodorn and phenobarbital—the latter especially in hypertension hearts—are all good for this purpose.

Pain and Restlessness.—Patients often wear themselves out tossing about in bed unless they are quieted down. One should not hesitate to use morphine in about 1/6 to 1/4 grain doses, or codeine in ½ grain doses, to obtain the proper relaxation. Hyoscine in conjunction with morphine is sometimes valuable in controlling severe cardiac psychoses.

Drug Therapy.—Digitalis. Digitalis deservedly holds first place among the cardiac drugs. No drug that can compete with it has thus far appeared on the market. The chief action of digitalis is that of slowing the heart rate by lessening the conductivity between the auricles and the ventricles through the direct action on the junctional tissues and indirectly through stimulation of the vagus. The effect of digitalis on the heart may be summed up as follows:

1. The heart contracts more fully, resulting in a more complete emptying of the chambers.
2. The systolic contraction is more rapid.

*The first part of this paper was published in the August, 1929, issue of Minnesota Medicine, pp. 487-495.

3. Diastolic phase is prolonged with a better diastolic dilatation.

Digitalis should be given in all forms of congestive failure. The best response is obtained in auricular fibrillation when the rate is markedly slowed and the minute volume output increased. The normal rhythm however is not restored through digitalis. Digitalis improves the heart action in enlarged hearts even with slow regular rhythm. It has been shown that asphyxia and increased acidity sensitizes the heart muscle fibers to the digitalis effect, and cardiac hypertrophy and exhaustion favor the increase in acidity as well as asphyxia. There may be improvement in the systolic contraction even if the rate is not slowed down through its use, and the presence of a slow regular rhythm is no criterion that the heart action may not be improved. In the terminal stages of decompensation there is often no beneficial effect because the heart has no reserve force left to mobilize. In all valvular lesions digitalis is indicated but its effect is less pronounced in aortic regurgitation. It is of little value in adhesive pericarditis or luetic mesoaortitis and is often dangerous in cases of toxic myocardium or true myocarditis. The indications for digitalis therapy may be summarized as follows:

1. Cardiac decompensation with auricular fibrillation.

2. Cardiac decompensation with hypertrophy associated with regular rhythm, rapid or slow.

3. Auricular fibrillation with or without decompensation.

4. Valvular heart disease with signs of failure, irrespective of valves affected.

5. In complete heart block, improves the coronary circulation and may increase the heart rate. In other conduction disturbances it should be given with caution or not at all.

6. In auricular flutter it is of value to change the flutter to a fibrillation and then to slow the rate.

If the heart is not entirely decompensated and can still mobilize some reserve force, the circulation will greatly improve through its use and the heart will compensate. The symptoms noted above will disappear and the edema and anasarca will gradually clear up through the diuretic action of the drug. Digitalis induces diuresis only in the presence of edema. Its direct action on the kidneys is slight, the diuretic effect being principally caused through the improved circulation which brings to the kidneys a greater quantity of better oxygenated blood. If after several weeks of careful treatment no definite improvement is discernible, the prognosis becomes more grave.

Dosage.—Digitalis is generally given in altogether too small doses to have any definite physiological effect, but occasionally, though rarely, is it given also in too large doses. The Eggleston dose should be given only with the greatest caution. It is well to administer the digitalis as a tincture by mouth, the initial dose being about 4 c.c., and giving 2 c.c. every four to six hours until one-half the Eggleston dose (one-seventh of the pound body weight in c.c.) is given. Following this from one to 4 c.c. daily may be given until the heart is digitalized and the desired effect is obtained. As a rule the pulse drops to about 70 per minute. The average subsequent tonic dose is from one to 2 c.c. daily and this can be kept up almost indefinitely, of course always under observation. To begin treatment with 5, 10 or 15 drops t.i.d. is almost useless, since there are about 40 to 50 drops in one c.c. and since the daily destruction and excretion of the drug would be greater than the intake, thus precluding the possibility of proper digitalization. Fifteen drops t.i.d. as a follow-up tonic dose may be sufficient in some cases. The above dosage is indicated only when the patient has not received the drug just prior to the institution of treatment; otherwise the dosage must be modified by making the necessary allowances for previous administration. The amount of the drug destroyed and excreted varies with the individual and with the quantity given.

Some decompensated patients develop anorexia, nausea and vomiting from the congestion in the gastrointestinal tract. These patients cannot tolerate digitalis by mouth for this reason. Such cases should receive the drug in about the same daily dosage but administered in 50 to 100 c.c. of water or normal saline by rectum as retention enema. Instead of giving the daily amount divided into three or four doses as by the oral route, it may be given in only one or two doses. The results from rectal administration are excellent and I consider it superior to the oral route as far as results are concerned. Hypodermic or intramuscular injections should be given only

when the other two routes are not advisable or possible, and the intravenous administration should be resorted to only in cases when an immediate effect is absolutely indicated. One must always bear in mind the cumulative effect of the drug, since its effect remains for a period of from eight to fourteen days following administration. Some patients are hypersensitive and develop toxic symptoms early. These symptoms are nausea and vomiting, oliguria, bigemini, polygemini, disturbances of conduction, ventricular tachycardia and pulsus alternans. A negative T wave in a previously normal electrocardiogram is evidence that the heart has been digitalized. Nausea and vomiting, oliguria, extra systoles and pulsus bigemini are signals of toxic effect of the drug and indicate that the drug should be temporarily discontinued. Ventricular tachycardia and pulsus alternans are evidences of more serious toxic manifestations.

2. *Quinidin.*—The place of quinidin in the treatment of heart disease still remains unsettled, as is evidenced by the enormous literature both pro and con that has grown up around it. The experience of many observers, however, indicates that quinidin has been a most valuable addition to the drug therapy of heart disease. Its value lies almost wholly in the treatment of auricular fibrillation and to a much less extent in the paroxysmal tachycardia. It is most effective in early fibrillation but is also valuable in many of the chronic forms. Statistics show that from 50 to 75 per cent of cases of fibrillation can be restored to normal rhythm through the use of this drug. Unfortunately the restoration is not permanent in all cases but a normal rhythm for from three months to several years can be obtained in a large number. Studies have shown that the velocity of the blood in a normal individual is about twice the velocity in one suffering from fibrillation and that in the latter, after normal rhythm has been restored, there is a definite increase in the velocity.

Beneficial results with quinidin therapy are thought to be brought about through its depressant toxic effect on the heart muscle and through the lengthening of the refractory period. Strongly toxic doses may induce ventricular fibrillation. The dangers associated with this drug are embolic phenomena and the depressant toxic effect on the myocardium which may result in sudden cardiac failure. However, the dangers of embolic phenomena are greatly overrated and careful observers find that embolic accidents are not more frequent with quinidin than in cases treated with digitalis. To me it appears that the dangers from emboli are greater in the non-treated cases since fibrillation as previously mentioned predisposes to auricular thrombosis even in compensated hearts. A compensated case with auricular fibrillation is therefore just as predisposed to the development of emboli as any decompensated case would be. It is obvious therefore that not to restore a compensated case to normal rhythm whenever that is possible not only leaves the circulation in a less efficient condition but also exposes the patient unnecessarily to the dangers of developing auricular thromboses and subsequently to embolic accidents.

There are certain contraindications to the use of quinidin. It should never be given while the patient is decompensated. The patient should always be previously digitalized. Cases with complete heart block with fibrillation and severe myocardial damage should not receive the drug. I generally continue the administration of a tonic dose of digitalis while giving the course of quinidin treatment. Some object to this method because the digitalis has an antagonistic effect to this drug. However, my experience seems to indicate that the results are better through the combined treatment.

Before instituting quinidin treatment an initial dose of the drug, 3 gr. (.2 gm.) in capsules, should be given to test out the patient for hypersensitiveness or idiosyncrasy to the drug. The treatment consists of administering increased amounts of the drug daily, adding about 6 gr. (.4 gm.) each day until a total of 60 gr. (4 gm.) or more is reached. As much as 200 (13.3 gm.) to 300 gr. (20 gm.) have been given in divided doses of 6 to 12 gr. to the dose, the size depending on the total dose in the twenty-four hours. For example, 42 gr. (2.8 gm.) may be given, 6 gr. (.4 gm.) every hour for five doses, then every two hours for two more doses. The doses must be given in rapid succession because the drug is rapidly excreted, generally in three to five hours. The patient must be carefully watched throughout the entire treatment for toxic effects. Some of the disagreeable symptoms from quinidin administration are vertigo, tinnitus, headache, nau-

sea, vomiting, nervousness and tachycardia. If the symptoms become severe the drug must be discontinued. A normal rhythm may be established with a dosage as mild as 6 to 12 gr. In most cases, however, 35 to 50 gr. in twenty-four hours are required. In some cases no amount of the drug would re-establish the normal rhythm. As soon as the normal rhythm is established a supporting dose of from 3 to 5 gr. t.i.d. is given to prevent if possible the reversion to fibrillation. The course of treatment may be repeated as often as is necessary, should fibrillation reappear.

3. *Strophanthus.*—This drug has been made very popular in France by Vaquez under the name of Oubain. Vaquez claims that it is the heart medicine "par excellence." In this country it is used very infrequently. Its action is similar to that of digitalis. It is given by mouth in doses of 2 to 3 mg. of strophanthin (Oubain) or 2 to 3 c.c. of 1:1000 solution. If an immediate effect is wanted the drug is given intravenously in doses of 1/240 gr. In such circumstances its action seems to be much superior to that of digitalis.

4. *Novasurol, Salyrgan.*—These drugs are preparations of mercury which have a profound diuretic effect. The more recent drug Salyrgan is a little less toxic, and just as effectual, as Novasurol. The diuretic effects are most striking when it is given in conjunction with ammonium chloride or ammonium nitrate. The latter drugs are given by mouth in doses of 75 to 100 gr. (5 to 6.6 gm.) daily for a period of five to seven days. During this administration the Salyrgan or Novasurol is injected hypodermically in doses of from 1 to 1.5 c.c. repeated in two or three days if needed. Like other mercury compounds, these drugs are more or less toxic to the kidney parenchyma. The urine has to be watched carefully for evidences of kidney damage such as granular casts and red blood cells. The presence of albumin alone is no contraindication. The urinary excretion is often increased to from 4,000 to 6,000 c.c. in twenty-four hours. The beneficial effect of mercury in cardiac edemas has been known for a long time, as is evidenced by the old favorite pills of digitalis, mercury and squills in the treatment of persistent cardiac dropsy.

5. *Iodides.*—Sodium and potassium iodides are of value in leutic meso-aortitis with or without decompensation. In hypertension and atherosclerotic types the benefits are very questionable.

6. *Caffein.*—Caffein sodium benzoate, gr. 3 (.2 gm.) and strychnin sulphate, gr. 1/20 (.003 gm.) given hypodermically are often of value as cardiac stimulants. The caffein has a diuretic effect and also causes a mild vasodilatation of the coronary arteries.

7. *Diuretin, Theocalcin.*—Diuretin or theobromin sodium salicylate and theocalcin or theobromin calcium salicylate are valuable diuretics in doses of 7.5 to 10 gr. (.5 to .67 gm.) t.i.d.

8. *Theocin* is synthetic theophyllin or tea alkaloid. Its indications and doses are the same as Diuretin. It is perhaps a little more effectual as a coronary vasodilator and is indicated in cases of coronary disease.

9. *Euphyllin.*—This is a valuable coronary vasodilator, most effective of all those thus far produced. It is the drug of choice in cases of coronary disease with or without angina pectoris. It is given dissolved in water in doses of 1.5 gr. (.1 gm.) four to five times daily. A few patients are sensitive to this drug.

10. *Nitrites.*—The nitrites lower blood pressure. Amyl nitrite when inhaled lowers the blood pressure very rapidly and is therefore indicated in the treatment of an attack of angina pectoris. Nitroglycerin and erythrol tetranitrate have similar though slower and more lasting effects. Nitroglycerin tablets of 1/100 gr. are used and are most effective when placed under the tongue.

SUMMARY AND CONCLUSIONS

1. Heart disease presents one of the most important problems confronting the medical profession today.

2. Heart failure signifies a condition of disturbed blood distribution with an accumulation of blood under increased pressure on the venous side and a corresponding deficiency on the arterial side.

3. Heart disease may result from certain physicochemical changes in the heart muscle that are not demonstrable anatomically.

4. Impairment of tonicity leads to cardiac dilatation.

5. In a general way, the heart enlarges at the expense of the cardiac reserve.

6. Normal hearts do not enlarge, no matter how great the strain.

7. When the cardiac outline is within normal limits, one must be exceedingly careful in diagnosing serious heart disease.

8. Impairment of contractility may lead to congestive heart failure or to angina pectoris. Pulsus alternans is one of its important signs.

9. Precordial pain on exertion signifies that the heart has reached the limit of its capacity.

10. Heart failure may result from (1) myocardial disease, (2) valvular disease, (3) disorders of rhythm.

11. Myocardial disease contributes by far the greatest number of cases of heart failure and essential hypertension with or without coronary disease is its principal etiological factor.

12. In essential hypertension, the rest force (work of the heart at rest) is materially increased.

13. Hyperthyroidism may produce severe myocardial damage through demand for increased work and through direct toxic degenerative lesions in the myocardium.

14. Rheumatic fever is the greatest etiological factor of valvular disease; the mitral valves are the ones most frequently involved.

15. Unimportant mitral and pulmonic systolic murmurs contribute greatly to the errors in the diagnosis of heart disease.

16. One must not make a stethoscopic diagnosis of heart failure; the stethoscope reveals practically no information relative to the efficiency of heart action.

17. Cardiac decompensation with edema and albuminuria resulting from essential hypertension is frequently diagnosed as nephritis.

18. An enlargement in the cardiac outline is the most important evidence that the heart is mobilizing its reserve force and is on its way to heart failure.

19. Myocarditis is a very rare condition, and the use of the term is much too frequent.

20. Auricular thrombosis occurs in auricular fibrillation even without decompensation. From the standpoint of embolism alone it is just as important to establish a normal rhythm as it is to treat decompensation.

21. Rest and comfort of the patient are the most important factors in the treatment of heart disease. *Prolonged* rest is very essential.

22. Of the cardiac drugs, digitalis holds first place. Proper dosage of this drug often brings brilliant results.

23. Digitalis is usually administered in altogether too small doses.

24. Quinidin is very valuable in the treatment of heart disease for restoring auricular fibrillation to a normal rhythm.

25. Venesection is a valuable therapeutic measure in cardiac decompensation, especially in cases with venous engorgement.

26. Paracentesis of large accumulations of fluid in the serous cavities should not be neglected in severe dyspnea.

27. Novasurol and salyrgan are valuable drugs in the treatment of cardiac edemas. Large doses of ammonium chloride or nitrate given simultaneously greatly increase the diuretic effects.

28. Gallop rhythm and pulsus alternans are evidence of severe myocardial damage.

29. A classification of heart disease is here presented which tends to combine etiological factors with clinical and pathological findings.

BIBLIOGRAPHY

1. Broadbent, Sir John F. J., Bart.: Some problems in the etiology of cardiac failure. Lancet, London, 214:217, 1928.
2. Farrell, J. T., Langan, Paul S., and Gordon, B.: A roentgen ray study of a group of long-distance runners. Am. Jour. Med. Sci., 177:324, 1929.
3. Haberlandt, L.: Das Hormon der Herzbewegung. Wien. Klin. Wchnschr., 39:1297, 1926.
4. Thacker, V. J.: The heart in hyperthyroidism. Med. Clin. N. Amer., 9:1093, 1926.

THE TREATMENT OF PSYCHIATRIC PATIENTS IN PRIVATE PRACTICE*

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MANY physicians assume that if a patient develops a psychosis the outlook for recovery is so unfavorable that immediate commitment to a state hospital should be secured. In view of this opinion, the communication of Dr. Arthur F. Kilbourne, Superintendent of the State Hospital for the Insane at Rochester, Minnesota, in the report of the State Board of Control for the period ending June 30, 1928, is enlightening:

"Since the opening of the institution July 1, 1879, to the beginning of this last biennium July 1, 1926, 17,073 patients have been admitted. The disposition of these patients on June 30, 1928, was as follows: Now in the institution, 938 or 5.5 per cent; recovered, 3,594 or 21 per cent; improved, 3,775 or 22 per cent; unimproved, 1,004 or 6 per cent; not insane, 74 or .4 per cent; dead, 4,661 or 27.4 per cent; transferred, 2,883 or 16.9 per cent; on parole, 144 or .8 per cent."

The purpose of this paper is to try to present the part that is played by psychiatrists in private practice in treating patients suffering from mental disturbances, and, as a result of this information, bring about better coöperation with physicians in general practice, who usually first come into contact with these cases and the problems they present.

The following statistics will prove of interest and will startle those who are not in intimate touch with the question of mental disease.

The summary of the Hospital Census of the American Medical Association for 1928 shows the present provision for patients in various types of hospitals in the United States.

This report shows that the total number of nervous and mental patients in the United States, 369,035, is 52.5 per cent of the entire number of patients in all types of hospitals combined.

During the year 1928 there had been a decrease of ten in the number of nervous and mental hospitals since the report of the previous year but an increase of 20,904 in the bed capacity and an increase of 19,368 in the number of patients under treatment. "Included under this head are the large state insane hospitals, neuropsychiatric research and teaching institutions, the private nervous and mental hospitals, hospitals for the feeble minded and epileptic, schools for backward and mentally defective children, and institutions for the treatment of drug and alcoholic addicts. The incidence of mental disease seems to be fairly uniform for all localities, one person in each 325 being in some kind of nervous and mental institution."[2]

Mr. Frederick W. Brown, Director of the Department of Information and Statistics for The National Committee for Mental Hygiene, has given some information that is of interest concerning patients in hospitals for mental disease in the United States as contained in the report of the Federal Census Bureau for the year ending January 1, 1923, which are the most recent detailed figures available.

Condition on discharge was reported by all but twelve hospitals, making the total number of discharged patients, whose condition on discharge was reported, 51,304. Of these 29,799 were males and 21,505 females. Also 11,935 or 23.3 per cent were discharged as recovered; 23,683 or 46.2 per cent as improved; 9,796 or 19.1 per cent as unimproved; 4,943 or 9.6 per cent as without psychosis; and 947 or 1.8 per cent as undetermined.

The general recovery rate per 100 admissions for the whole United States was 13.6, the rate for the males being 12.5 and for the females 15.1. The rate of discharge as improved was 27 for all patients; 26.2 for males; and 28 for females. The report states that, "The higher recovery and improvement rate among females is due principally to the excess of females in the manic-depressive group, which yields a high per centage of recoveries, and to the excess of males in the general paralysis group, which yields practically no recoveries."

*Presented before the annual meeting of the Minnesota State Medical Association, St. Paul, May 13 to 15, 1929.

AVERAGE NUMBER OF PATIENTS IN HOSPITALS ACCORDING TO TYPE OF SERVICE

Type of Hospital	Number of Hospitals 1928	Number of Beds 1928	Average Percentage of Beds Occupied 1927*	Average No. of Patients (Not including New-born) 1928
General	4,361	363,337	66.0	239,802
Nervous and Mental	553	394,268	93.6	369,035
Tuberculosis	508	62,113	80.3	49,877
Maternity	164	5,912	64.2	3,795
Emergency (industrial)	169	7,290	52.7	3,842
Convalescent and rest	171	7,347	68.6	5,040
Isolation	92	8,479	36.6	3,103
Children's	65	5,669	69.0	3,912
Eye, ear, nose and throat	77	2,879	53.0	1,526
Orthopedic	64	5,713	79.6	4,547
Skin and cancer	15	1,012	64.3	651
All other hospitals	84	6,084	86.4	5,256
Hospital departments of institutions	529	22,831	56.8	12,968
Totals	6,852	892,934	78.7	702,738

*Results in the column at the right are obtained by applying the percentages to the number of beds given in the column at the left. It is assumed that the average percentage of beds occupied in 1928 would be the same as in 1927, since that percentage varies little (less than 1) from one year to another.

Thus, in the hospitals on January 1, 1923, there were 267,617 patients, of which total 9,231 were in private hospitals or 3.4 per cent. Of the patients admitted during 1922, 15,678 of the 89,455 or 17 per cent were admitted to private hospitals; of the 52,777 patients discharged during 1922, 13,105 or 24 per cent were in private hospitals, and of the patients who died during 1922, 1,393 of the 25,656 or 5.4 per cent died in private hospitals.

A detail of this report shows that on January 1, 1923, there were in the State Hospitals of Minnesota, 7,245 patients, while only 59 patients were receiving treatment in private hospitals for mental disease in our state, but this did not include mental cases in general hospitals and this number would therefore be increased somewhat, especially because of the relatively large number in one general hospital which will be referred to later. These figures are probably approximately correct today, as the last report shows that there had been an increase in the state hospital population of 299 since January 1, 1923, and the increase in the number in private hospitals is probably only proportionate to the increased number in the state hospitals since that time.

The data previously referred to has dealt with the definitely psychotic patients but, for the purpose of this paper, there will be included the borderline mental conditions such as the cases of depression without delusions, the psychoneuroses, alcoholism and drug addiction. These patients all ordinarily require hospital care and this may be in either a public or a private hospital. If the case is one of a psychosis particularly, the family physician often advises immediate commitment to a state institution without giving any consideration to treatment in a private hospital. The writer believes firmly that all of these patients should first be admitted to a private hospital if possible for the sake of accurate diagnosis, as otherwise there is danger of non-psychotic patients being committed on account of lack of facilities for proper study. It is of practical importance, also, to the members of the family if symptoms of mental trouble are present to know whether or not the condition is a

DATA FROM REPORT OF FEDERAL CENSUS BUREAU, YEAR ENDING JANUARY 1, 1923

Class of Hospitals	Number of Hospitals	Patients in Hospitals 1-1-23	Patients Admitted during 1922	Patients Discharged during 1922	Patients Who Died during 1922
State	165	229,837	63,808	34,281	21,602
Other Public*	148	28,549	9,969	5,391	2,661
Private	213	9,231	15,678	13,105	1,393
Total	526	267,617	89,455	52,777	25,656

*County, city, and United States Veterans Bureau Hospitals.

psychosis, as we know what a big part inheritance plays in the occurrence of mental disease. Each case requires careful study, as even what appears like a frank psychosis may prove to be another condition, as is shown by the following cases:

Case 1.—Mrs. M. L., 56 years of age, widow, housekeeper, was referred by Dr. J. A. Evert of Glendive, Montana.

The patient was admitted November 6, 1927, with provisional diagnosis of psychosis, type undetermined, later changed to acute lethargic encephalitis. She was accompanied here by a nurse and her son-in-law, from whom the following history was secured. The patient was perfectly well until October 17, when in the afternoon she had an attack of abdominal pain so severe that she told the family that evening she was afraid she would die. The pain ran from region of stomach up into chest. A physician was called that evening and prescribed a diet with free catharsis. She stayed at a hotel during the next two weeks carrying out this treatment and the doctor saw her several times. The patient slept very little during this time, in part because of pain, but mainly because of insomnia. On October 29 she was visited by the son-in-law who accompanied her here, and his wife, and they noticed nothing abnormal mentally. She said she was feeling more comfortable and they need not worry about her, but shortly after their departure she made an attempt to jump out of the window, and was taken to a hospital, where she was seen for the first time the following day by Dr. Evert. The nurse who accompanied her here had been on duty for almost a week and said the patient's abdomen had been tremendously distended but that this was much improved on admission. Bowels had moved well with laxatives and she had eaten liquids but only with urging and had the delusion that she was an intermediary between God and the world. She had voided without difficulty. The patient had required a hypodermic of ¼ grain of morphine sulphate and 1/100 grain of hyoscine every four to six hours the previous week to quiet her.

The family history was negative as to nervous or mental breakdowns, but the patient, two daughters and her mother were subject to migraine, and one brother had them very severely. One brother was rather eccentric and had died from a probable carcinoma of the stomach.

Personal and past history was negative.

The patient's condition on admission here was that of great excitement. She was noisy and resistive and spit out her medicines and refused to eat or drink. In fact, she had all the symptoms of an acute functional psychosis which one would, on first impression, consider typical indications for State Hospital care. Her tongue was dry, pulse good, heart sounds and lungs negative. The blood pressure was 140-82. Her temperature on admission was 99.2 axillary and she ran this temperature or a little higher until December 7, when it became normal and remained so thereafter. Her pulse was in the 80's during this time. Hemoglobin was 80, white blood cell count 20,000, which dropped to 11,100 in two weeks. Urine on admission showed plus one albumin and gave a positive Fehling's test with twelve drops, but was negative otherwise. Fehling's test was positive on four or five occasions the first days in hospital, then this disappeared and the urine was entirely negative at time of discharge. Blood sugar was .148 on admission.

On November 7 it was not possible to examine the patient satisfactorily as she still was very excited and resistive. She chewed constantly as though she had some gum in her mouth and kept repeating the word "corn cob" in a loud voice. She answered no questions, though opened her eyes and looked around in an investigating manner when those about her were quiet. Her abdomen was greatly distended with gas, but no tenderness, rigidity, nor masses were present. Pupils and eye muscles could not be examined satisfactorily, but on ordinary observation eye movements were normal. Deep reflexes in the upper extremities were normal, but could not be determined in the lower extremities because of her resistance. No muscle soreness was present. Neck rigidity was probably absent but could not be tested satisfactorily as she was too resistive.

The condition remained about the same until on November 10 the patient became lethargic and there was a suggestion of ptosis of the left lid. The left pupil was smaller than the right. There was definite nystagmus and a suspicion of eye muscle paralysis. The deep reflexes could not be obtained in the lower extremities and there was definite neck rigidity. Spinal fluid on November 8 was clear, under normal pressure, negative as to cell increase, colloidal gold curve and Wassermann reaction, with one plus Nonne present. Diagnosis was changed to lethargic encephalitis and energetic treatment for encephalitis in the form of sodium salicylate intravenously in increasingly large doses was instituted at once, to which she responded splendidly.

On December 1 the patient was more rational and had been up some. Her general condition was better in every way.

On December 8 she still continued to improve further, but still had a slight headache although this was less marked than it had been previously. On February 1 was discharged in a very normal condition.

On March 12 of this year Dr. Evert was kind enough to send a report of her condition, from which I shall quote: "She is apparently in very good health and has made a very good recovery from her lethargic encephalitis. When I first saw her she was confined in a cell in the county hospital here. She had the same mental confusion as she had when she arrived in St. Paul. Her former doctors, however, were anxious and willing to have her placed in the State Hospital for the Insane. This is no criticism of them but is merely said to show that the patient was mentally unbalanced and in all of their opinions she was an insane woman."

This case illustrates well the value of a general hospital at least in the beginning of acute

psychotic clinical pictures because had there not been the early recognition of the encephalitis and the immediate institution of energetic treatment for this inflammatory brain condition, it is probable this patient would have died and the family history might have had the odium of the mistaken diagnosis of a functional psychosis, because with an overload of work on physicians as so often exists in the State Hospital, the correct diagnosis might easily have been missed.

The following case illustrates a somewhat different type, but one in which the diagnosis is often confused with an acute psychosis because of the symptoms.

Case 2.—Mr. C. C., single, aged 23, a student, was referred by Dr. R. M. Burns.

The patient was first seen in the early part of September, 1927, when he had returned to the hospital about a month following a sinus operation which had been performed for the relief of a very severe frontal headache together with suggestive prepsychotic symp- had been present for a number of weeks. Instead of these symptoms having been relieved they had become aggravated. His chief complaints now were of frontal headache together with suggestive prepsychotic symptoms consisting of depression, hysterical reactions of laughing and crying without apparent reason and schizophrenic reactions in the form of childish behavior.

His family history was negative except that his mother had died in a State Hospital several years after commitment, so that the family background tended to mislead one in the diagnosis. Neurological examination and eye backgrounds were negative, but about three weeks later the eye backgrounds showed evidence of increased intracranial pressure, so the patient was sent to the hospital. On October 2 a lumbar ventriculogram was taken and the *x*-ray picture indicated the presence of a lesion in the right central temporo-parietal region which corresponded to the clinical localization, as the deep reflexes in the left lower extremity had now become more active than in the right. The spinal fluid was clear but showed the presence of a large number of cells which at time of examination were considered to be lymphocytes, but which in retrospect we thought might have been the manifestation of a gliomatosis manifesting itself in the spinal fluid, for when patient was operated upon, Dr. Robert Earl found an infiltrating glioma in the suspected area and at postmortem November 23, 1927, practically the whole right cerebrum was found invaded by this tumor.

These two cases are representative of differential diagnostic problems constantly occurring in our contact with so-called acute mental conditions, and it is such cases which have caused us to feel the desirability of handling them, during the beginning period at least, in a general hospital where all diagnostic aids are within easy reach and complete hospital facilities exist for instituting prompt and efficient treatment, both medical and surgical, according to the indications.

The following case is a good illustration of a large number of mild mental conditions in which, to secure a satisfactory result, far more attention by physicians and nurses is required in the consideration of intimate individual difficulties confronting the patient than can possibly be given in state institutions. The personal mental handling is the most important necessity for their intelligent treatment and recovery. Such selected patients can be treated most satisfactorily in a general hospital as room or ward patients among the other types of patients requiring medical care.

Case 3.—Mr. C. S., age 34, married, a laborer, on admission, May 22, 1927, stated that the previous fall he had found it necessary to move his family and because of shortage of homes he could not procure a suitable house so moved into a "bunk car" which was situated in the train yard. His friends were surprised that he would live here and remarked that his entire family might be killed by some train if it ran off the track. This began to prey on his mind and he lost interest and could not sleep well. He then began to worry constantly about the possibility of having tuberculosis of the lungs. In January on the advice of his local physician he went to a State Hospital as a voluntary patient and stayed there for seven weeks, when he ran away and had been home for six weeks before coming here. He had no delusions or hallucinations but complained mainly of pains in his head. It was apparent that anxiety and depression were his most distressing symptoms. He had a fear of insanity and of death.

Family history: Mother died from gallbladder attack but she was a nervous type and had a tendency to worry. Three brothers are living and well. One brother killed himself at forty years of age during a spell of depression. One brother was accidentally drowned. He has two sisters and they are both inclined to be nervous.

Personal history: He finished the eighth grade at school and then worked on a farm until he was nineteen years of age, after which he worked around at various odd jobs. At twenty-one years he married and for the past ten years has worked as a section hand. He has four children living and well. His wife is in good health.

Past history is not significant except for appendectomy ten years ago during an acute attack.

His general physical, neurological and laboratory examinations were negative. He was admitted to the psychopathic department but after a few days he was transferred to the ward as our observation convinced

us that he could be treated on the general floor safely. After a marked initial improvement he made no further gain, when one day he told us that he had a fear of going home because his local physician had told him when he advised him to go to the State Hospital that unless he did so he might kill his wife and family. Now, when assured that there was no danger of this, he said he thought he could go home and get along all right. In a few days he was discharged with instructions to report to us from time to time, and in a short while returned to full duty and has maintained his family in a normal way ever since.

There may be a difference of opinion as to whether psychiatric patients should be treated in a general hospital or not, but all the neuropsychiatrists on the staff of one of our local general hospitals which has accepted such cases for over twenty years are agreed that thoroughly satisfactory treatment may be given in a general hospital provided, as in this one, a special department is furnished and the treatment of the psychiatric patients is limited to the neuropsychiatric staff. Thoroughly satisfactory treatment includes medical supervision by a psychiatrist, nursing service by those trained in the care of nervous and mental patients, facilities for hydrotherapy, a properly supervised department of occupational therapy and recreation, complete laboratory facilities, modern diet kitchens with facilities for providing special diets, operating rooms available for complications existing or arising during the course of the mental disease, and consultants at hand for an opinion on any problem outside of the psychiatric field.

The hospital referred to has a total capacity of one hundred twenty-five beds, with a department of sixteen specially silenced rooms provided for psychiatric patients. In the past ten years, during which time accurate records have been kept, the following have been treated: Psychoses, 1,854; alcoholics, 313; drug addicts, 57. In recent years a group nursing plan has been in effect in this department, by which graduate nurses especially trained in psychiatric nursing are employed by the hospital and the patient is charged a rate for the room which is only slightly higher than the price of the average room on the general floor and a charge for the nursing service which is a part of what the cost would be for one special nurse. In this way nursing service is available at all times at lower cost than if one graduate nurse went on duty for a twenty hour period, and many of these patients would require two special nurses on twelve hour duty. Thus the expense is reduced without sacrificing high grade nursing care. As soon as the patient's condition justifies it, he may be moved to a room or ward on the general floor at the same rate charged the general medical or surgical case. This results in shortening the time of the increased expense for special nursing required and also the patient can make his adjustment to the conditions of ordinary life quicker by passing through the transition from the special care in the psychiatric department to the conditions of home life by first meeting those of general hospital life. In this hospital the importance of occupational therapy and diversion both in and out of doors, has been recognized and a full time director has been employed, resulting in the hospital stay being more pleasant and the improvement more rapid. This feature should surely be included by any hospital which aims to give attention to the care of psychiatric patients.

We realize that there are many physicians who have a very definite prejudice against the admission of any psychiatric patients to general hospitals. Nevertheless, these hospitals are constantly admitting, without their knowledge, patients who are in need of psychiatric handling, as is evidenced by suicide or attempted suicide in addition to the accidents that occur through delirium existing in patients not suffering from psychoses. The author firmly believes that a day will come when no general hospital will be considered to be rendering full service that does not provide a suitable department for the treatment of patients with mental symptoms, either as an integral part of itself or through close association with such a hospital. Dr. Peter Bassoe of Chicago, in a recent letter commenting on the crying need for facilities for the care of mental patients in general hospitals, said, "Some of our large hospitals which rather brag of not admitting insane patients have found that they all the time have cases on hand which have developed after admittance. This is especially true of surgical patients."

The following case illustrates how truly mental patients are sometimes admitted to a general hospital without recognition. It is an unusual mental case that comes complaining of what he recognizes as mental symptoms, because to him his ills seem to arise from some entirely different source.

Case 4.—Mr. G. S., aged 44, married, a German

farmer, was admitted to the hospital August 18, 1927, complaining so definitely of stomach symptoms that his physician gave no thought to the possibility of a mental condition existing. Three days later he loosened the screen from his window on the third floor and jumped to the ground with suicidal intent, receiving multiple fractures, including those of the vertebræ. He was then transferred to the psychiatric department, when it was first recognized that the gastric symptoms were merely a part of a delusional condition and then, as so often happens, a friend gave us the additional history that the patient had been nervous and depressed for some time and that one night before coming to the hospital he had gone to a pond in his pasture planning to drown himself. He told his friend later he did not do so because he heard some spirit tell him not to jump in, so he lay down on the bank for several hours and then returned home. The patient made a good recovery after a prolonged stay in bed on account of the nature of his injuries, and on November 24 was discharged. A report from his wife in February, 1928, said that the patient was getting along nicely.

When the patient recovers sufficiently to return home, there sometimes develops in the follow-up procedure danger of the old saying applying, "Too many cooks spoil the broth," unless there is an understanding coöperation existing between the family physician and the psychiatrist. The family must be instructed, of course, to call the family physician immediately if any acute physical condition arises, and sometimes local supervision of some chronic ailment, such as heart disease, is advisable; but the real management of the remaining mental symptoms should still continue in the hands of the psychiatrist who treated the patient during hospitalization. The best coöperation is secured between the family physician and psychiatrist when they consult together if complications, medical or surgical, arise. This coöperation will be greatly improved when students are taught in medical schools more generally the great truth so well stated recently by President Glenn Frank, University of Wisconsin: "When all is said and done, the doctor must treat patients, not parts of patients."

Many medical schools are recognizing this and are now furnishing their students with clinical material either in psychopathic hospitals or in state hospitals in the same manner as in clinics in all other branches. Our own medical school has recently instituted a plan for this purpose which is perhaps best stated in the following extract from a letter dated April 17, 1929, from Dr. W. L. Patterson, Superintendent of the Fergus Falls State Hospital:

"The plan put into effect by the medical school on the first of January of having the senior medical students go to each of the state hospitals for a period of three weeks' training has proved to be a very satisfactory and worthwhile arrangement, it seems to me. We have had internes here continually since the first of the year. The other state hospitals, Rochester and St. Peter, have also had internes for three weeks' training. They are divided into groups of eight or nine, either two or three men going to one of the state hospitals for a period of three weeks. As long as the material is not available in the Twin Cities this is about as good an arrangement as could be made in order to give the senior medical student a comprehensive view of the mental cases in the mass. By coming in personal contact with them and making their own mental examination they are really getting something that will be of assistance to them if they go into general practice."

Before concluding this paper, the writer wishes to call attention to another matter that deserves consideration and this is that the presence of a psychosis creates usually a family problem and the psychiatrist in private practice should help to solve it. If the family cannot afford treatment in a private hospital, he should advise how commitment can be arranged so that care in a state hospital may be secured and in suitable borderline cases he may suggest that the patient enter a state hospital as a voluntary patient. During the last biennium 212 voluntary patients were admitted to our State Hospitals.[3] If the economic condition permits a period of observation and treatment in a private hospital, this, in the opinion of the writer, should always be provided in the hope that a brief stay will result in recovery or in sufficient improvement so that the patient may be treated at home. If a reasonable period of hospital observation and treatment has not resulted in improvement, or if the diagnosis upon admission is that of an unfavorable psychosis, early commitment to a State Hospital should be recommended, although when the patient or family can afford prolonged treatment in a private hospital, this should be encouraged rather than to allow the family struc-

ture to be weakened by transferring to the state a duty they themselves should carry.

Probably two of the greatest problems that a psychiatrist faces in the matter of advice is what to give with reference to the care of the suicidal depressed patient without delusions and of the patient with delusions of persecution.

For the former class, the ideal treatment, of course, is admission to a hospital where they may be cared for in the psychiatric department during the time of marked depression when there always is great danger of some suicidal attempt. They may be transferred into the general part of the hospital when the depression has moderated, although even then the physician feels uneasy, and, in spite of using careful judgment, will occasionally have some patient attempt suicide. However, recovery will be facilitated if the patient is permitted increased liberties and increased opportunities as his condition improves and warrants these concessions and the physician should not be too severely criticized if an accident of this kind does occur occasionally. It is often better to take some chance rather than have the patient feel that he is being watched constantly. If the family cannot afford private treatment, commitment is often not possible unless suicide has actually been attempted. Occasionally such a patient can be persuaded to enter a State Hospital as a voluntary patient.

The second problem is that of the individual with delusions of persecution. This type of individual should have prolonged if not permanent hospitalization because these are the chronic types of psychoses and are also definitely dangerous. It is often difficult to commit these individuals, also, because of their mental alertness and clever way of convincing others that they actually are receiving unfair treatment. Dr. Arthur H. Ruggles, Superintendent of the Butler Hospital in Providence, Rhode Island, recently wrote me to this effect: "In our part of the country we have had a number of tragedies resulting from the actions of this type of patient, and I am becoming more and more convinced that an individual who still retains persecutory delusions is a dangerous individual to have outside of a hospital."

Modern medicine has in general advanced rapidly in recent years but the treatment of mental disease has not received the recognition that such a big problem deserves. It is hoped that physicians and hospitals will become sufficiently interested in providing every facility for the adequate treatment of those afflicted with mental disease. It is to be hoped that general hospitals will in the near future recognize the importance of providing well organized departments for the treatment of such patients equal to the standard of all other departments. Then and only then can one say that medicine is advancing symmetrically in all its realms.

REFERENCES

1. Fourteenth Biennial Report of the State Board of Control of Minnesota, Period ending June 30, 1928, page 85.
2. Journal of the American Medical Association, March 30, 1929, Volume 92, No. 13, pages 1047-1048.
3. Fourteenth Biennial Report of the State Board of Control of Minnesota, Period ending June 30, 1928, page 17.

CASE REPORTS

RECURRENT FRACTURES OF THE PATELLA*

REPORT OF CASE

W. A. Piper, M.D.
Mountain Lake, Minnesota

The patient, a female, at present thirty years of age, 5 feet 3 inches in height and weighing 195 pounds, fell and fractured her right patella. She had the so-called "bone doctor" treatment and was not seen by me until six months later. At this time the upper third fragment was drawn up about a distance of 4 inches above the lower fragment. There was no swelling present and the patient had a distinct limp, dragging the limb forward as she walked.

The fracture occurred March 6 and no operation was performed until September 4. A semilunar incision was made, the quadriceps tendon lengthened, the surfaces of the fracture freshened and brought together by the circular method, kangaroo tendon being used and side sutures of chromic catgut. Normal recovery with good union occurred in about six weeks.

In July of the following year while riding in an automobile over some rough roads the patient struck her left knee against a blanket bar and fractured the left patella transversely. A week later a second operation was performed identical with the first operation except that the quadriceps tendon was not lengthened. Primary union with normal function resulted.

Seven weeks following recovery the patient slipped on a wet floor and refractured the same patella, this time in the upper third transversely. Operation was again performed with a normal result.

About nine months later the patient again fractured the same patella. She at first refused operation but after twelve weeks consented. The procedure was the same except that at this operation the quadriceps tendon was lengthened again with a normal result.

Eleven months later she again fell and refractured the same patella. This time she refused operation and I put the limb up in extension with the use of pillows. The fragments were held together by adhesive tape. She made an uneventful recovery after seven weeks and has had no further trouble. She had fractured the left patella four times, of which three were operated upon and the last one treated by taping.

The patient has no stiffness in her knees and has complete function of extension and flexion. Her only difficulty is when she mounts or descends steps and when she attempts to run. There is no noticeable limp or interference in the least when she walks on level ground.

Summing up the case one might say, "Much ado about nothing." However, the recurrent fractures with normal recoveries and the delayed periods between operations and time of fracture makes the case somewhat unusual. The use of absorbing sutures in preference to drilling and wire sutures has aided considerably in giving the patient such good functional results.

*Presented in symposium before the annual meeting of the Minnesota State Medical Association, Saint Paul, Minn., May 13, 1929.

EARLY MOBILIZATION AND DIATHERMIA IN FRACTURE OF THE ELBOW*

REPORT OF TWO CASES

Warner G. Workman, M.D.
Tracy, Minnesota

I have checked over 75 fractures involving the elbow joint to compare results obtained since we adopted early passive and active motion with diathermia.

Our series is not large enough to again divide it into two groups: first, those with early motion with diathermia, and, second, those with early motion without diathermia.

By the results obtained I do not refer to anatomical reduction for I presume that the anatomical reduction is just as good or just as bad as formerly except that skill in reduction and holding fragments in position improves with experience. The point I am interested in is the functional result and how soon that functional result can be obtained.

I know that with fractures occurring in this location we were not always satisfied with the function and much dissatisfied with the length of time it required to get these people back at work, particularly our railway employees, until we began very early mobilization of the joint and diathermia.

I should not care to have to argue with the man who does not use or believe in the use of diathermia but I know the patients like it. The private patient swears by it and not at it and is willing to pay for it because of the relief it gives him.

The thing I like about it is that it brings the patient to the office at least every other day and gives one an opportunity to exercise the joint.

By early mobilization I mean taking off the splints at the end of ten days and starting motion; and by diathermia I mean double plates for at least forty-five minutes at least every second day, plates the same size and approximately 100 Ma. per square inch.

We have reduced our time of obtaining normal func-

*Presented in Symposium before the annual meeting of the Minnesota State Medical Meeting, St. Paul, May 13, 1929.

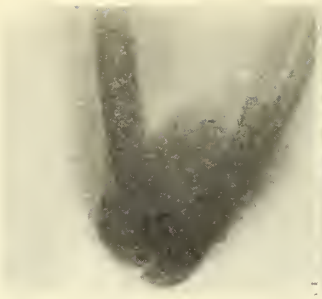

Fig. 2

Fig. 1

Fig. 3

Fig. 4

Fig. 5

Fig. 8

Fig. 9

tion or almost as good function as we are going to get from two weeks to a month by this regime.

I wish to report two cases. The first, a man aged 35, injured from falling from a moving box car, sustained a compound comminuted fracture involving the elbow joint. The first slide shows the fracture before reduction; the second, increase of displacement when acutely flexed; the third, after the best reduction which we could get, with callus formation after six weeks. The last two show the final results of extension and flexion at approximately nine weeks.

Figure 6 shows the condition, before reduction, of an

Fig. 6

Fig. 7

elbow fracture in the case of a girl aged 11, injured March 20, 1929, by falling from a hay rack. The portion following reduction is shown in Figure 7 and the extension and flexion obtained by May 4, 1929, six and one-half weeks after the fracture, are depicted in Figures 8 and 9, respectively.

INTRACAPSULAR FRACTURE OF THE NECK OF THE FEMUR*

REPORT OF CASE IN A NINETY-THREE YEAR OLD PATIENT TREATED BY ARTIFICIAL IMPACTION AND WHITMAN ABDUCTION IN A PLASTER CAST

R. C. Webb, M.D.
Minneapolis

This case is presented to illustrate this treatment in a very aged person. The Whitman abduction treatment in a plaster case is today agreed to be the proper treatment for this injury. There are many surgeons, however, who agree with this method of treatment, but whose courage fails them when they are confronted with a very old person with a fractured hip.

This old lady, ninety-three years of age, stumbled and fell to the floor on November 23, 1928, and I saw her immediately and placed her in the Asbury Hospital. The *x*-ray showed an intracapsular fracture of the neck of the left femur with the distal fragment displaced upward about one inch and outward in the usual manner. She appeared very old and very frail and she had a large adenomatous goiter also.

My courage also failed for the time being and I waited four days and then gave her a general anesthetic on a Hawley table and reduced the fracture. An *x*-ray taken immediately with a portable *x*-ray apparatus showed the fragments in perfect apposition.

A few years ago I saw Dr. Cotton of Boston demonstrate his method of impaction in cases of this type at a fracture meeting in the Cook County Hospital in Chicago and after viewing the *x*-ray I did an artificial impaction and placed the patient in a plaster cast from the nipple line to the toes with the limb in abduction and internal rotation.

An *x*-ray film made immediately afterward showed perfect alignment of the fragments in abduction with definite impaction present.

The usual after-care was given, consisting of turning her over on her abdomen for one hour three times daily and raising her in bed, etc. As soon as she recovered from the anesthetic she told us how much more comfortable she was than before being placed in the plaster cast.

Her courage began to fail after one month and she began to eat very poorly and her blood pressure dropped from one hundred thirty systolic to one hundred in a few days. She was given an egg-nog containing a little artificial courage and this was kept up during the next two months and she got along very nicely.

The plaster-of-Paris cast was removed February 26, and an *x*-ray taken then and compared with previous films showed that the head moved with the shaft and the bones in the same apposition with very slight evidence of absorption.

It is now three and one-half months since the injury. She has survived the usual period of treatment and appears in good condition for a woman of ninety-three years. She will be kept in the hospital a few more weeks and will be supplied with a brace for weight bearing purposes and will probably wear it until August, when she will be ninety-four years of age.

SUBSEQUENT REPORT

This patient was supplied with a walking caliper brace and returned to a home for the aged four months after injury. She was taken outside for daily fresh air and encouraged as much as possible but she gradually failed and died three months after leaving the hospital and seven months and one week after receiving the injury.

Inasmuch as the expectancy of life in a person ninety-three years of age is very low we are left to theorize as to the relation of the treatment to her death. According to the American experience table of mortality for persons ninety-three years of age there were records of seventy-nine persons and of these fifty-eight died during the year, giving a death rate of seven hundred thirty-four per thousand and an average expectancy of nine and one-half months. According to these figures this patient missed her expectancy by two months and one week, which is not excessive on a basis of nearly one hundred years.

*Presented before the Minneapolis Surgical Society, March 7, 1929.

DELAYED ACAPNIA AND SHOCK FOLLOWING RESECTION OF A RIB: REPORT OF A CASE IN WHICH RELIEF WAS OBTAINED BY ADMINISTRATION OF DILUTE CARBON DIOXIDE*

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A girl aged seven years suffered an attack of general malaise, headache, chills, and vomiting, March 2, 1929. A diagnosis was made of pneumonia involving the right side and the patient was admitted to the hospital March 10. General examination and roentgenograms indicated the presence of fluid and March 11, 50 c.c. of clear fluid was obtained by diagnostic aspiration of the right thoracic cavity. Diagnostic pleurocentesis was repeated a week later, when a slight amount of cloudy fluid was aspirated. April 1, another aspiration definitely revealed pus. The cavity was emptied of pus and resection of a rib through the posterior periosteum was done for prolonged drainage. Adequate drainage was obtained and the cavity was irrigated with physiologic solution of sodium chloride. The patient's improvement was progressive. The empyema cavity, which originally had a capacity of 250 c.c., was reduced to a capacity of 30 c.c. in three weeks. The patient continued to have exacerbations of chills, fever, and so forth, after the tube had been removed; this indicated the presence of a residual pocket. It was thought best to unroof this pocket by resection of ribs and this was done May 1. Removal of portions of three ribs was necessary in order completely to unroof the pocket, which contained about 350 c.c. of pus. The patient had considerable reaction following the operation; the temperature was 103° F., the pulse rate was 70 beats a minute and respirations were 67 a minute. On the afternoon of the third postoperative day, respirations had increased to 80 a minute, were shallow, and numerous fine râles were heard over both lungs, particularly at the bases. The patient's color remained good until the afternoon of this day, when it was thought best to begin treatment by the oxygen tent. This treatment was continued for about thirty hours, without noticeable improvement except that the cyanosis disappeared. Congestion of the lungs increased and respirations were shallow.

On the evening of May 4, it was decided that the child needed carbon dioxide. Various methods of supplying her with carbon dioxide were considered. She was very fretful, fearful, and suspicious; it would have been almost impossible, and certainly inhuman, to have forced her to submit to the application of a mask and to inhale carbon dioxide from a bag. Administration of morphine to a point at which accumulation of carbon dioxide in the blood could have been depended on, would have reduced the depth of respirations. This was considered undesirable because of the râles which could be heard over the entire chest. Since, already, she had become better accustomed to the oxygen tent, it seemed advisable to use the tent as a mask, to remove the soda-lime from the apparatus, and to add carbon dioxide to the air in the tent, directly from a tank of pure carbon dioxide. This procedure was carried out and there was noticeable increase in the depth of respiration. The respiratory rate dropped from 80 to 64; then it returned to 78. However, the child immediately became drowsy and less fretful; after four hours in the tent, respirations had been reduced to between 50 and 60 a minute, the pulse rate reduced to 140 and the temperature reduced to about 101°. There was difficulty in handling this small, fretful patient, and the gas was administered at night; therefore, we were prevented from making analysis of the gas in the tent and we do not know exactly the proportion of carbon dioxide that it contained. We do know, however, that at times the patient had a slight cough, and that the amount of carbon dioxide from the cylinder was then reduced from 15 to 10 gallons an hour, and the coughing stopped. The flow of oxygen into the tent was circulated over ice constantly. We believed that the behavior of the patient would be the best guide to the amount of carbon dioxide that should be administered, and that if she received too much she would give evidence of it by complaining of a sense of suffocation, by increased respiratory movement and by coughing.

The depth of respirations increased markedly at times. There was some coughing, which seemed to come only when the flow from the tank was too great. The mixture of gas in the tent was diluted by the air in the tent and by leakage of air into the tent. Therefore, the concentration of carbon dioxide in the tent was not very great. The treatment by means of oxygen and carbon dioxide combined was continued for four hours, when it was decided to take off the tent and allow the patient to breath air. The patient rested well all night; the respiratory rate remained between 50 and 70. The following day, the rate fell to 45, but it began to increase again in the evening, and shallowness of respiration and signs of pulmonary congestion returned. Oxygen and carbon dioxide were given again, this time for only one and a half hours. There was a greater reduction in rate and increase in depth of respiration, and less tendency to coughing than at the previous time. There was no return of symptoms of acapnia after this period of administration of oxygen and carbon dioxide, and the respiratory rate fell to as low as 40 and never became elevated above 60. The result of administering carbon dioxide to this patient was rather spectacular and most gratifying to all

*Submitted for publication July 19, 1929.

concerned. May 7, the temperature was 101°, the pulse rate 140, the respiratory rate 45, and the patient's condition was greately improved.

BIBLIOGRAPHY

1. Henderson, Yandell: Acapnia and shock. I. Carbon dioxide as a factor in the regulation of the heart-rate. Am. Jour. Physiol., 1908, xxi, 126-156; II. A principle underlying the normal variations in the volume of the blood stream, and the deviation from this principle in shock. Am. Jour. Physiol., 1909, xxiii, 345-373; III. Shock after laparotomy; its prevention, production, and relief. Am. Jour. Physiol., 1909, xxiv, 66-85; IV. Fatal apnoea after excessive respiration. Am. Jour. Physiol., 1909-1910, xxv, 310-333; V. Failure of respiration after intense pain. Am. Jour. Physiol., 1909-1910, xxv, 385-402.
2. Henderson, Yandell, and Scarbrough, M. M.: Acapnia and shock. VI. Acapnia as a factor in the dangers of anesthesia. Am. Jour. Physiol., 1910, xxvi, 260-286.

POISONING FROM METHYL CHLORIDE USED IN DOMESTIC REFRIGERATORS

At the 1929 annual session of the American Medical Association the House of Delegates, recognizing the dangers of toxic gases used in industry and in the home, asked the Board of Trustees to appoint a committee to look into the situation and to advise the medical profession and the public for the good of the public health. In the meantime additional deaths from the use of methyl chloride in mechanical refrigeration have occurred in Chicago as determined by a special coroner's jury, which has recommended the discontinuance of the use of methyl chloride as rapidly as possible, the temporary use of warning gases with methyl chloride until substitution of some less hazardous gas shall be made, and a definite warning by manufacturers to users of such apparatus as to the hazards involved. (Jour. A. M. A., July 27, 1929, p. 288.)

MORE DEATHS FROM THALLIUM

Three more deaths from thallium poisoning are reported. Three boys, aged ten, eleven and twelve years respectively, received successive doses of thallium acetate for ringworm. Although influenza had left one of them apathetic and the other two were mentally dull since birth and all three were undernourished, the dose of 0.008 Gm. per Kg. of body weight was either given or its administration begun. The effort to give the calculated amount in divided doses caused death as have other similar attempts. Only one dose should be given, and for children infirm in any way this should be less than the usual amount. (Jour. A. M. A., July 13, 1929, p. 122.)

President's Letter

The Storage of X-ray Films

At this time this is a pertinent subject and should have the serious consideration of the State Association, its component county societies, of groups and of individuals, more especially those conducting *x*-ray laboratories.

The disaster at Cleveland May 15, last, has brought about a natural desire on the part of those whose duty it is to care for the welfare of our citizens to enact laws or ordinances tending to the prevention of a recurrence of such a calamity.

At the present time it appears that the City of Minneapolis is the only City in Minnesota having an ordinance regulating this matter. It is now proposed to enact regulations much more drastic. On June 24, last, a meeting of representatives of the Fire and Buildings Departments of Duluth, Minneapolis, and St. Paul, was held at the office of the State Industrial Commission, at which measures calculated to insure safety were discussed. A careful perusal of the proposed Minneapolis ordinance leads us to the conclusion that its passage unmodified would work unnecessary and unwarranted hardship upon many of the members of our profession. Dr. E. L. Tuohy, president of the St. Louis County Society, has appointed a committee of which President-Elect Boyer is chairman. This committee have given the subject serious consideration and as a result have offered some valuable suggestions. Doubtless Dr. E. L. Gardner, president of the Hennepin County Society, and Dr. Wallace H. Cole, president of the Ramsey County Society, will appoint like committees. For the State Association the committee on Public Policy and Legislation has the matter in hand.

It is hoped that no hasty action will be taken by any municipality and that due consideration be given the use of safety films and that a reasonable time be given in which to comply with whatever ordinance may ultimately be passed. Consideration should also be given to the passage of a State law at the next meeting of the Legislature.

President,
Minnesota State Medical Association

EDITORIAL

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X-RAY BURNS OF THE PHYSICIAN'S HANDS

One contemplates the maimed hands of such pioneers in radiology as Holzknecht, Levy-Dorn, and Baetjer—to mention only a few of the martyrs to this medical specialty—with a feeling of pride in their accomplishments and sorrow at their sacrifice. But the contemplation of similar burns on the hands of physicians of this day and age evokes only astonishment at their ignorance and carelessness.

That roentgen dermatitis of the hands is markedly on the increase amongst physicians is indicated by the large number of serious cases which have been observed this year in Minnesota alone. That these burns are occurring almost exclusively amongst the general practitioners in the smaller communities of the state is significant. It is rare to find any skin changes on the hands of the younger roentgenologists who are, no doubt, utilizing *x*-rays far more constantly than the average general practitioner.

Roentgen dermatitis, with all its sequelæ of ulceration, warts, epitheliomata, skin grafts, and amputation, is a most crippling disease. When occurring on the hands of a physician it is indeed unfortunate and doubly so because it is entirely preventable. There is a deplorable tendency for the distributors of *x*-ray apparatus to sell their product to untrained medical men without even a word of warning as to the dangers which lie in the handling of these powerful instruments. The willingness of intelligent physicians to utilize radiation without proper education is even more deplorable. The methods of protection against the injurious effects of radiation are well known, have been described repeatedly and should be carefully read and strictly observed by any one who proposes to use radiation for diagnosis or therapy. The occurrence of burns amongst the pioneer radiologists was excusable because they had to learn from this unhappy experience the deleterious effects of radiation and the methods of protection against them. The absence of burns amongst the younger specialists in this field, in spite of the large amount of roentgenoscopy and radiation therapy which they do, attests to the effectiveness of these methods of protection. The development of an *x*-ray burn today indicates always a gross error or gross negligence.

The greater number of extensive and severe burns occur as a result of prolonged roentgenoscopy during the reduction of a fracture or removal of a foreign body. The bare hands are used for manipulation and in some cases have been exposed almost continuously for periods of two or three hours, with disastrous results.

The observance of certain simple rules may prevent almost all harmful effects. Only a brief summary of the more important of these can be given here. The *x*-ray tube used in roentgenoscopy should be at least twenty-five inches from the fluorescent screen and should be completely enclosed by lead or leaded glass. A filter of one millimeter of aluminum should always be in place. The current values of the radiation should not exceed five milliamperes at a peak voltage of eighty-ninety thousand (approximately a five-inch spark gap). During the examination the lead diaphragms should be adjusted to as small an opening as possible and the current should be interrupted at frequent intervals. Manipulation of the patient during roentgenoscopy should never be done with the bare hands. Lead rubber gloves should be worn whenever possible and, if not, an ordinary leather glove helps considerably. In manipulating a fracture or removing a foreign body the current should be turned on only at infrequent intervals, the manipulation being done chiefly without radiation. In all roentgenoscopy the examiner should never place his hand between the patient and the *x*-ray tube; it should always be between the patient and the screen. The physician should never hold a patient during therapy or during the exposure of a film. More detailed and exact rules can be found in any standard textbook on radiology. The use of radiation is a dangerous procedure. Its deleterious effects can practically all be prevented by the application of our present knowledge.

Leo G. Rigler, M.D.

THE AMERICAN PUBLIC HEALTH ASSOCIATION ET AL.

The meeting in Minneapolis, towards the close of the month, of a national society the size and importance of the American Public Health Association merits special editorial attention. The coincidental meetings of some nine other national, regional and state organizations whose concern is the public health, make the week of September 30 to October 5 a red letter week in the local calendar.

The majority of the medical profession are concerned with curative medicine as applied to the individual. Preventive medicine as applied to social groups is in fact the more important and is demanding an increasingly larger share of the profession's time and personnel.

The coming convention will, it is true, be in large part devoted to the preventive phases of medicine, with emphasis placed on education, not only of physicians, nurses and workers in the various activities represented, but education of the public.

Here, at our door, comes the opportunity to acquaint ourselves as physicians with the scope of these various health associations and to broaden our field of knowledge of the specific health agencies, active in our state and country. Health associations should be directed or advised by members of the profession and it behooves us to take advantage of this opportunity to become better acquainted with a number of them.

OUR PERTURBED ORGANIZERS

The writer gets much information and considerable stimulation out of the pages of the American Medical Association Bulletin. There one reads medical oratory at its best and even if denied the opportunity of attendance at some of the various assemblies held under the auspices of the mother house in Chicago, the echoes rise from the pages, of dangers sensed, attacks diverted, and movements won. Those guiding this standardizing machinery deserve our loyal support rather than cynical or lethargic comment. Nevertheless, it can do them no harm to prick a few of their alarm bubbles and possibly direct their zeal to more productive fields.

Recent attendants at the American Medical Association meeting came back none too impressed with the depth, scope, manner of presentation, or novelty of many of the papers heard. Of course, there were the usual noteworthy exceptions. This bold statement is made because of the alarms and fears expressed in the Bulletin and elsewhere that special societies and (particularly) hospital staff meetings are absorbing the doctors' interests and that it is in their

closer circles that the best educational material is being presented.

The fear is unfounded: these societies are the proving ground for developing men. The real trouble lies in the formal machinery—political and otherwise—which absorbs so much of the time and vitality of the American Medical Association and our State Societies. Those who are fearful should subordinate a lot of the pomp and ceremony, and not a little plain bunk, in the big meetings; the small ones are here to stay. They are developing and displaying methods as direct as they are helpful. They come direct to the vital issues of the day and are first to sense them. Little time is lost in official greetings and triumphal entries. Romans like Titus had an arch for their reception, not so much to tickle their vanity as to "pep" up their followers and successors to return to the provinces not only to perpetuate the system, but to garner the provincial bacon.

E. L. TUOHY, M.D.

MISCELLANEOUS

STATE BOARD OF MEDICAL EXAMINERS

INDIAN HERB DOCTOR ARRESTED AND FINED

After an investigation by Mr. Brist on behalf of the State Board of Medical Examiners, Mrs. Mary Jeffery, half-blood Indian, was arrested for violating the Basic Science Law in Le Sueur county; Mrs. Jeffery has been treating people in the vicinity of Belle Plaine and New Prague for the past several months. Large sums of money have been paid for treatment of cancer, diabetes, asthma and other ailments.

Bail was set at $1,000.00, which was not furnished, and Mrs. Jeffery was taken to the county jail at Le Sueur Center.

On August 9 at Glencoe, Minnesota, Mrs. Jeffery entered a plea of guilty and was fined $100 and court costs amounting to $26.90; a jail sentence of 60 days was imposed and suspended on condition that she refrain from selling herbs and roots in this *state.*

Judge Tifft warned the defendant that she *must keep out of the healing business* entirely.

THE GLOVER HEIGHT-INCREASING FRAUD

Clara Louisa Glover and "Bernard Bernard" (the latter's real name, according to the federal authorities, is Trappschuh) were engaged in exploiting a device for the alleged purpose of increasing the height of those who desired to be taller. Neither Glover nor Trappschuh is a physician. Trappschuh, under the name, "Bernard Bernard," publishes books on sexual subjects and fad diets. The device itself consisted essentially of a halter to be placed about the head of the user which permitted adjustment to a height which would barely enable the user to touch the floor with his feet. After investigating the device and the claims that were made for it the postoffice authorities closed the mails to "L. Glover, Specialist," and "L. Glover" at Sausalito, California. Glover and Trappschuh then transferred their operations from California to Chicago, and advertised the device under the trade name, "Glover Institute." Accordingly the postoffice authorities extended the fraud order to cover the name of the Glover Institute at Chicago. (Jour. A. M. A., July 6, 1929, p. 53.)

CRYSTALLINE PEPSIN

Within a comparatively few months successive announcements of the isolation of crystalline insulin, crystalline tuberculin, crystalline urease and crystalline pepsin have followed one another. This crystalline pepsin possesses all the enzymatic properties: it hydrolyzes gelatin, casein, egg albumin and edestin in acid solution and is rapidly inactivated by alkali or heat. It crystallizes in small prisms. The highest peptic activity thus far secured is about 1:20,000 U. S. P. (Jour. A. M. A., July 27, 1929, p. 285.)

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

THIRTY YEARS OF PUBLIC HEALTH

It is thirty years since The American Public Health Association came to Minneapolis. That is the lifetime of a generation, but it covers the days within which many generations come and go—within which much has happened. The American Public Health Association was a small affair in those days. Its program was poorly developed. Its science of health was crude.

Things have come a long way since then. Not only has the parent organization grown greatly. Its offspring of health associations and health agencies has multiplied the country over. Seven National Bodies are coming to Minneapolis in this year of 1929. But even that is far from the whole tale of events.

The consciousness of the American people has wakened widely, in these later days, to the superlative values of human health. It is no longer content to be sick—even though, by grace of Providence and the Doctor, it recovers. It is learning that the price of disease is impaired health; that a man, as well as a machine, is so much the worse for having to go under repairs. It is finding out that the doctors', the nurses' and the hospital bills come high, but that diminished vigor, lessened power capacity, curtailed enjoyment of life come higher still. It wants to be well—wants its children to be well—nay more, wants to know how to grow better and to see them grow better as the years go by. It has heard that disease is preventable and it wants it prevented. It is being taught that human health means the health of the whole piece—that physical welfare, mental welfare, moral welfare, social welfare are all one; that positive physical well-being, mental growth, emotional balance, self-discipline or control, the thoughts a child thinks and the things a child does, at work or at play, all enter into the making of character. All this is part and parcel of health—public, communal, personal health. Hygiene is, after all, but the science of good behavior.

Public health has come a long way toward medicine and medicine is coming a long way toward public health. There is still a long way to come. In these anticipated meetings there is a great opportunity for them to get together. They are *not* one. They will never become one. Each has become too great to be inclusive of the other. But they have much in common. There is a vast deal of knowledge which each may bring to the service of the other. They are in touch at numberless points of professional experience.

Let the whole medical profession of Minnesota come to Minneapolis, for at least a day, to welcome its public health brethren and sisteren, to attend the Northwest Conference for Child Health and Parent Education (for even medical parents have much to learn), to study the Educational Health Exhibit to be put before the people at large; to urge each other along in the pursuit of human health, to help each other to win toward a common goal.

Richard Olding Beard, M.D.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

AMERICAN PUBLIC HEALTH ASSOCIATION NORTHWEST CONFERENCE FOR CHILD HEALTH AND PARENT EDUCATION

A number of national, regional and state health associations will convene at the Auditorium in Minneapolis towards the close of September.

The Conference of State Sanitary Engineers will begin its sessions at the Curtis Hotel Saturday, September 28. The other members of the group, including the Conference of State Laboratory Directors, will convene Monday, September 30, at the Auditorium.

The third annual session of the Northwest Conference for Child Health and Parent Education will open at the Auditorium Wednesday, October 2, at 9 a. m., and will run for a day and a half, the morning sessions of Wednesday and Thursday, October 2 and 3, and the Wednesday evening meeting to be held jointly with the American Child Health Association.

A Popular Health Program, consisting of health talks, demonstrations, radio, delineascope and lantern slide exhibits is planned for each afternoon from October 1 to 5.

The Educational Health Exhibit, to be presented under the joint auspices of the American Public Health Association and the Northwest Conference for Child Health and Parent Education, for the benefit of the public will be open from Tuesday morning, October 1, until Saturday noon, October 5.

Visitors will be asked to pay a registration fee of one dollar, which will grant admission to all of the sessions of the various association meetings.

AMERICAN COLLEGE OF PHYSICAL THERAPY

The Clinical Congress and eighth annual meeting of the American College of Physical Therapy will be held in Chicago, November 4 to 7, 1929, at the Sherman Hotel.

One half of each day will be devoted to a variety of clinics in the various specialties with joint meetings of all sections for the presentation of numerous addresses of general interest to physicians. Education in physical therapy will be stressed. Duly licensed physicians as well as technicians and assistants, properly sponsored, are invited to attend.

The program and other information may be obtained by writing the Exective Offices, American College of Physical Therapy, Suite 716, 30 North Michigan Avenue, Chicago, Illinois.

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

The annual outing of the West Central Minnesota Medical Society was held July 14, 1929, at Glenwood, Minnesota, Dr. E. A. Eberlin acting as host. The next meeting of the society will be held at Morris, Minnesota, October 9, 1929.

HENNEPIN COUNTY MEDICAL SOCIETY OPENS NEW HOME

On September 26, 27 and 28, Minneapolis physicians of the Hennepin County Medical Society will celebrate the opening of the new Medical Society home on the twentieth floor of the new Medical Arts Building.

The occupying of these commodious and luxurious quarters of the Society, uniquely situated upon the top floor of this beautiful building, will be an epoch event in the history of the Society.

The new home, consisting of a large auditorium, spacious library and reading rooms, committee rooms, kitchen, business office, lounge and open-air terrace, is being fully equipped with everything that will promote the scientific advancement of the membership. The opening program will consist of dedicatory exercises, Friday and Saturday morning clinics by prominent guest clinicians, golf tournament, a Saturday night smoker, and many other events of scientific and social interest.

The membership of the Society is extending a cordial invitation to the physicians of the northwest to participate in this event.

MINNESOTA SURGICAL SOCIETY

Members of the Minnesota Surgical Society will meet in Duluth, Saturday, September 14. Headquarters will be at the Duluth Clinic, 205 West Second Street. Present officers of the society are: President, Dr. M. G. Gillespie, Duluth; secretary, Dr. Daniel H. Bessesen, Minneapolis.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

At the annual meeting held in June at Winona, Mankato was selected as the meeting place for the 1930 convention of the Southern Minnesota Medical Association, the time to be in September or October, a definite date to be decided later.

Election of officers for the coming year resulted as follows: President, Dr. Waltman Walters, Rochester; first vice president, Dr. J. T. Schlesselman, Mankato; second vice president, Dr. C. B. McKaig, Pine Island; secretary, Dr. M. C. Piper, Rochester.

By resolution members of the Association established a medal for the best scientific exhibit to be shown at the state medical convention or for the best research work done by a medical student at the University of Minnesota.

WISCONSIN STATE MEDICAL ASSOCIATION

The eighty-eighth annual meeting of the Wisconsin State Medical Association will take place at Madison, September 11, 12, and 13, 1929. A three-day scientific program has been announced, the annual dinner the evening of the twelfth to be addressed by Dr. William A. Pusey of Chicago.

Members of the Minnesota State Medical Association have been extended a cordial invitation to attend.

CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*
Minnesota State Medical Association
11 West Summit Avenue, Saint Paul, Minnesota

1. *Question.*—Farmer, aged 59, negative family history. He has had difficulty in swallowing for the past five years. Food seems to be regurgitated before it reaches the stomach. He has lived largely on liquid food and has lost 70 pounds since the onset of the present illness. No complaints of pain, heartburn, or acid eructations. There is slight tenderness in the epigastrium but no palpable tumor. He was told that there was a kink in his esophagus when first examined five years ago. Patient is nervous, highstrung and wilful. He can swallow coffee but no soup or milk. He is thin and has a lemon yellow color. Urine negative. Blood pressure 120-70. He has improved slightly on bismuth subnitrate, gr. V, Magnesia Gr. X; Blenol and essence of pepsin, Q. S. A. D. dram 1. *X*-ray examination was made of the esophagus and stomach. The plates show a dilated esophagus with a constriction near the diaphragm. The stomach is apparently normal. What diagnosis would you make?

   Answer.—The most probable diagnosis of your patient's condition is cardiospasm. Malignancy can be ruled out from the appearance of the film, the duration of the symptoms and the complaints of the patient. The background for cardiospasm is a neurotic constitution. The treatment is dilation of the spasm and correction of neurotic habits. This is usually done by bougies. Secondary malignancy may occur at the constricted portion. A better idea of the condition of the wall may be obtained by having the patient swallow a thick barium paste, and taking the picture shortly afterward. The paste should be held in the patient's mouth until you are ready to make the exposure. Atropine and other antispasmodics may be tried but dilating the spasm by instruments is the best method.

2. *Question.*—Do you consider the La Motte apparatus for doing blood sugar reliable? What is the best single volume for a general practitioner on diseases of the eye? What is your choice for a single volume on diseases of children?

   Answer.—The La Motte blood sugar apparatus is a fairly reliable clinical method. It has the advantage of being less complicated than the regular hospital laboratory methods. Any of the simpler types of laboratory apparatus do not give fine distinction but they give the gross differences which are sufficient for clinical work. A good single volume on diseases of the eye is May ($4.00); or Parson ($6.00). Diseases of Children: Chapin and Royster ($7.50), Holt and Howland ($8.50), or Porter and Carter ($10.00). The last named book has a great deal of space devoted to therapy.

3. *Question.*—I have a patient with unresolved pneumonia due to Type II infection by bacteriological examination at the time of the onset, April 16. Right lower lobe involvement. Patient was treated with specific serum. At present he shows good general improvement. Temperature varies from normal to 100, pulse 80 to 90. No sweats or chills since the acute stage of illness. Posteriorly, lungs still show physical signs of consolidation. Moist rales indicative of resolution have been present for the past eight weeks, but bronchial breathing and slight dullness still persist. There has been no fluid accumulation at any time, although aspirations were done to check findings. No *x*-ray facilities are available. Have thought of possibility of tuberculosis, but no bacilli have been found in the sputum. I would like to do a Mantou test. What are the possible untoward effects in case of reaction, and also what about the reliability of the information to be gained? Patient is a young man, 26 years of age, with a negative past history.

   Answer.—The Mantou test is slightly more sensitive than the Von Pirquet test, that is—it may be found in tuberculous infection when a negative test would ordinarily be obtained by the latter method. This test is not advised for your patient because a positive reaction would not mean anything more than tuberculous infection at some time and a negative might be found in the presence of active infection. When a lung fails to resolve, organizing pneumonia, abscess and empyema should be considered. The most helpful thing for you to do would be to get some good *x*-ray studies. Sometimes an encapsulated empyema (interlobar) will give a history like the one you have presented. The history does not suggest lung abscess. Very frequently the lung signs in pneumonia are very slow in clearing. With physical findings similar to the ones you have presented the *x*-ray may show practically nothing. The future conduct of your treatment should be based on accurate *x*-ray studies.

4. *Question.*—Female, patient, aged 23, single, was taken sick in April, 1929, with a para-rectal abscess between the anus and the vagina. This was opened and a fistula resulted, which was operated on about July 15, 1929. Following this the patient was given mineral oil, drams II, twice a day. The result from the fistula operation seems fairly good, although there is still some thin discharge and the patient is quite tender posterior to the anus. We have thought of the possibility of another abscess developing. She has had from three to four stools since the onset of her illness but does not know anything about the character of the stools and does not remember having a true diarrhea. Because of a recent experience with amebic dysentery I examined a fresh warm stool for ameba but did not find any. The patient has never been outside of the state. Can you give me any suggestions as to the cause of the frequent stools? If you think it might be possible that she has amebic dysentery what is the best method of examining the stools? Why should she have repeated para-rectal abscesses?

   Answer.—The probable cause of frequent stools is irritation in the rectum and anus, from the neighboring inflammation. The story does not resemble amebic dysentery although more stools should be studied. The best method of finding the organism is to examine the warm stool as you have done. Sometimes a little blood streaked mucus may be picked off the mucus membrane and examined for ameba. The probable cause of the repeated accumulations of pus in the anal region is failure to get adequate draining. Examine the bowel for an internal opening of a fistulous tract and open widely to this point. Both the internal and external sphincters should be cut through so the base of the cavity is completely exposed.

NEW AND NON-OFFICIAL REMEDIES

ABBOTT LABORATORIES
Viosterol-Abbott

BENZOL PRODUCTS CO.
Neocinchophen-B. P. C.

DICK X-RAY CO.
I-X Barium Meal

PARKE, DAVIS & CO.
Parke, Davis & Co.'s Viosterol

E. R. SQUIBB & SONS
Viosterol-Squibb 100 D
Squibb's Viosterol Cod-Liver Oil 5 D
Squibb's Viosterol Cod-Liver Oil 5 D Mint-Flavored

TERRELL'S LABORATORIES
Rabies Vaccine Phenolized, Terrell

TRUTH ABOUT MEDICINES

Isarol-Ciba—Sulphonated Bitumen, N. F.—A preparation obtained by dry distillation of bituminous shale. The distillate is sulphonated with sulphuric acid and subsequently neutralized with ammonium carbonate. The product complies with the standards for sulphonated bitumen, N. F. It has the actions and uses of sulphoichthyolate preparations and substitutes (New and Non-official Remedies, 1929, p. 398). (Jour. A. M. A., July 6, 1929, p. 33.)

Ampoules of Pitressin.—An aqueous solution containing the pressor and diuretic-antidiuretic principle of the posterior lobe of the pituitary gland (betahypophamine) containing less than 1 unit of oxytocic activity per c.c. It is standardized by the method of Hamilton and Rowe so that each c.c. contains 20 pressor units (1 unit represents the pressor activity exhibited by 0.5 mg. of standard powdered pituitary U. S. P.). This product is used for temporary stimulation of blood pressure, for increasing the muscular activity of the bladder and intestinal tract, also for anti-diuretic effect in diabetes insipidus. It is marketed in 1 c.c. ampoules. Parke, Davis & Co., Detroit.

Ampoules of Pitocin.—An aqueous solution containing the oxytocic principle of the posterior lobe of the pituitary gland (alphahypophamine) containing less than 0.5 unit of pressor activity per c.c. It is standardized by the U. S. P. method for pituitary, each c.c. containing 10 International units. This product is used to stimulate uterine contractions for obstetric purposes. It is marketed in 1 c.c. ampoules. Parke, Davis & Co., Detroit. (Jour. A. M. A., July 13, 1929, p. 117.)

Rabies Vaccine (Phenolized).—An antirabic vaccine (New and Non-official Remedies, 1929, p. 356) prepared according to the general method of David Semple (phenol-killed). It is marketed in packages of 14 vials, each containing 3 c.c., and in packages of 21 vials, each containing 3 c.c. Terrell's Laboratories, Fort Worth, Texas. (Jour. A. M. A., July 27, 1929, p. 283.)

OF GENERAL INTEREST

Dr. A. L. Arends, formerly of Saint Paul, has moved to Wright, Minnesota.

Dr. and Mrs. Emil Geist of Minneapolis have returned from an extended trip abroad.

Dr. and Mrs. Archie H. Beard of Minneapolis have returned from a three months' trip abroad.

The twelfth annual meeting of the American Dietetic Association will be held in Detroit, Michigan, October 6 to 11, 1929.

Dr. and Mrs. C. C. Chatterton of Saint Paul have returned from Europe, where they spent two months in England and France.

The marriage of Miss Cordelia Pond and Dr. Henry E. Wunder, of Shakopee, Minnesota, took place August 1, 1929. Dr. and Mrs. Wunder will make their home in Shakopee.

Dr. Owen W. Parker of the Shipman Hospital Staff, Ely, Minnesota, and his son, Addison, have returned from a recent scenic and historical tour of the Eastern States and Canada.

Word has been received of the death of Mrs. W. M. Dodge, wife of Dr. W. M. Dodge of Farmington, Minnesota. Besides her husband, Mrs. Dodge is survived by a daughter, Miss H. L. Dodge, and a son, Dr. W. M. Dodge, Jr., both of Minneapolis.

Mrs. Mary Coventry of Duluth, mother of Dr. W. A. Coventry, died at the age of 78 years, in July. She is survived by two sons, Dr. W. A. Coventry of Duluth, and Dean Coventry of Willmar, and two daughters, Mrs. James Shaw of Duluth and Mrs. D. L. Fairchild, Willmar.

Mrs. A. T. Caine, wife of Dr. A. T. Caine, superintendent of the state hospital for insane at Anoka, Minnesota, died Tuesday, July 16, 1929, following an illness of three weeks. She is survived by her husband, a daughter, Helen B. of Wellesley, Massachusetts, and a son, William.

A series of one-day post graduate courses will be held at the tuberculosis sanatoria of the state during the latter part of October. These will be for the physicians of the state of Minnesota only and will be held at the following institutions: Fair Oaks Lodge, Wadena; Sand Beach Sanatorium, Lake Park; Sunnyrest, Crookston; Pokegama Sanatorium, Pine City; Southwestern Sanatorium, Worthington, and the State Sanatorium at Walker. A more detailed announcement will appear in the October number of MINNESOTA MEDICINE.

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Meeting of May 2, 1929

The regular monthly meeting of the Minneapolis Surgical Society was held at the home of Dr. H. B. Sweetser, Sr., Thursday evening, May 2, 1929. The meeting was called to order at 8 p. m. by the President, Dr. S. H. Baxter.

Dr. E. C. Robitshek presented two cases, in which the adhesive plaster method for the rapid regeneration of skin over granulating wounds had been very successfully employed. Before the cases were presented, a brief description of the method of application was made, and an explanation given of the rapid epithelial growth, with this method of treatment. This method was successfully employed in the treatment of chronic ulcers thirty years ago, and is still being used, though unfamiliar to many physicians.

The first case presented was that of a young woman, who suffered an *x*-ray burn over the upper and mid-dorsal spinal region. The burn was irregular in shape, but measured about 15 cm. by 12 cm. at its greatest length and width. This burn was the result of a fluoroscopic and *x*-ray examination made about March 19, 1926. The patient entered the Minneapolis General hospital in July, 1926. The family history was negative. She had previously undergone an operation for appendicitis and had had a gastroenterostomy, directly following the *x*-ray diagnosis of the same, when the burn developed. The patient was first seen on August 1, 1926, previous to which time various medications had been used in an effort to heal the burn, but with little success. On August 13th, she was taken to the operating room, with the hope that by excising the ulcer and its base improvement might result and a granulating base for a skin graft result. The wound became infected and Dakinization was resorted to. When the area appeared healthy, and active granulation taken place, it was decided to treat this area with the adhesive tape method. Improvement at once took place. The patient left the hospital on January 17, 1927. Since that time it had been necessary to operate twice on this patient, the first time for multiple fibroids, a subtotal hysterectomy, and ten months later for an acute intestinal obstruction, due to adhesions, at which time about eight inches of gangrenous bowel were removed and an end-to-end anastomosis performed.

The second case presented was that of a woman, who was a washerwoman by occupation, who on the 1st of March, 1929, caught her right hand in a wringer and suffered an almost complete avulsion of the skin of the dorsum of the hand. The thin skin sloughed out, leaving an exposed area over the back of the hand about 8 cm. in diameter. Under adhesive strip taping, the open exposed area had entirely healed, so that at this date, the patient was working again at her occupation.

This form of treatment for the rapid regeneration of skin over granulating wounds is, in my opinion, a most satisfactory method in every way. Dressings need be changed but once or twice a week, the method is most simple, no special care being necessary so as not to infect the wound area, the treatment is painless, and when once the skin surface is healed the skin is firm and pliable. The advantages over skin grafting are no second raw skin area, no pain, and no danger of infection. However, to attain the best results, details must be carefully attended to. These, however, are trivial.

DISCUSSION

Dr. O. H. Wangensteen: Dr. Robitshek has presented a very useful method of covering skin defects. An ordinary defect will heal without much trouble if kept clean. Carrel and de Nöuy, during the war, expressed in a formula the rate of healing in a wound. A larger defect heals relatively more quickly than does a smaller one. They found that if infection supervened in a wound the rate of healing was delayed.

Skin grafting is a method employed to accelerate wound healing. In 1920, Wilhelm Braun of the Friedrichshain Hospital in Berlin employed a new method of skin grafting. It is a very simple but effective manner of covering a denuded area. An advantage of the method is that it can be employed where other methods of skin grafting would not work.

The method consists in the implantation of small pieces of skin about 2 to 4 sq. mm. in size, into the granulations, in such a way that the implant just disappears from sight, much in the manner in which potatoes are planted in the ground. The skin is obtained by cutting the skin as one ordinarily does for a Thiersch graft, and cutting it into small pieces. The only condition that must be fulfilled in employing the method is that granulations must be present. The method, however, works well in the presence of infection, and it is not necessary that the granulations be healthy. I have implanted these grafts, with a satisfactory result, into the granulations of a wound in which the wound edges have separated and feces from a colostomy are poured over the wound. I first employed the method last September in a man who had had a thigh amputation for arterio-sclerotic gangrene of the leg. A large pressure sore developed just over one of the ischial tuberosities, with considerable undermining of the skin. As soon as granulations appeared in the wound, these grafts were implanted and

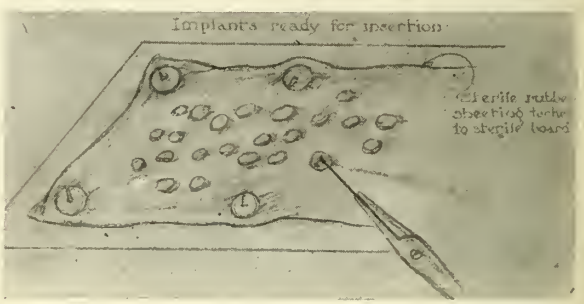

Fig. 1

with surprising rapidity the defect became covered with epithelium..

When these grafts are submerged beneath the granulations, they lie dormant for awhile and can not be seen. An area rather pale in appearance becomes apparent after five to eight days where the implantation is done. An area of depression then occurs in the granulation tissue, immediately about the implant (this apparently only occurs when large implants are used, and I believe it represents an expression of a natural antagonism between epithelium and granulation tissue). Then, almost from day to day, the wound defect appears smaller, a white film of epithelium, propagated in part from the margins of the wound and partly from the independent growth of the grafts, spreads over the surface of the defect. The last portion of the wound is the slowest to close.

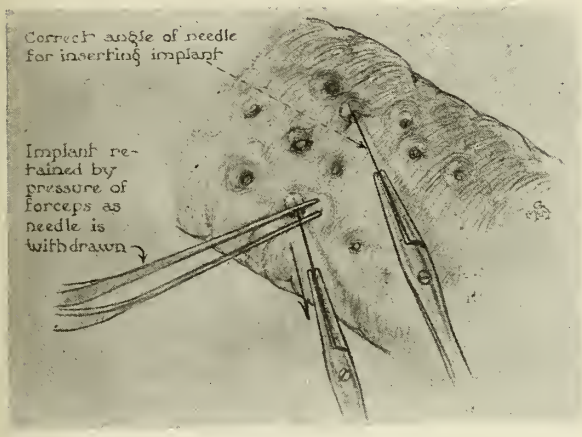

Fig. 2

Directly after the implantation, the wound is covered with strips of sterile vaseline gauze. No pressure is applied. After three or four days these are removed, and the wound is covered with a double thickness of gauze, and Dakin's solution is poured on sufficiently frequently to keep the wound clean and free from discharge. There is no danger in washing the grafts off by this method.

Soon after Braun's publication of the method, Pels-Leusden macerated skin and injected it subcutaneously with a syringe, with the same result. These grafts are really a tissue culture in vivo, and undoubtedly these grafts have a much better chance to survive than those laid on the surface, as in the Reverdin and Thiersch methods.

We have employed the method now at the University Hospital in more than twenty cases. In many of these instances, it has been employed where the ordinary Thiersch and Reverdin grafts would have proven satisfactory. The absolute indication for the method is where other methods would fail, as in osteomyelitic cavities, chronic empyema cavities, large pressure sores, etc. In one patient suffering from a paraplegia from a metastatic carcinoma of the cervix uteri to the lumbar spine, who developed a deep pressure sore over the sacrum, I used the method. Just before death occurred some weeks later, a photograph showed that the defect was practically healed. The healing had taken place even though the patient lay on her back a good deal of the time and in spite of urinary and fecal incontinence.

The cosmetic result in some extensive burns, in which we have employed these implants, has not been above criticism. In others, however, in which the local destruction of the burn has been less intense, a very satisfactory cosmetic result has followed. Unlike the small deep graft, this implant fuses with the rest of the skin and does not preserve its identity. A very large defect can be covered with a small amount of skin by this method. It is a mode of skin grafting that can be used on ambulatory patients, and on occasions we have used it in the outpatient department. I am certain that anyone who gives the method a trial will be pleased with the results.

Dr. A. A. Zierold: This method of which Dr. Wangensteen speaks recalls my experience with the method of Pels-Leusden when it came out in 1921. I tried his method of making a pulp of the papillary layer of the skin and injecting very deep under the granulations with a paraffine syringe. It isn't nearly as easy as it sounds and in my hands it wasn't entirely satisfactory. Its chief advantage is that you can use it in infected fields. To overcome these difficulties I have been using Reverdin grafts implanted with a sharp pointed forceps. In talking with Dr. Wangensteen I find his method is practically the same and the end-result is the same. The papillary portion of the skin is used and it is planted deeply beneath the granulations where it is perfectly protected. Pels-Leusden has some microscopic sections wherein he shows the epithelium growing out from the deep layers in a fungating mass. You can dress them with almost anything. You can put gauze on or wipe off the surface and you won't wipe off the graft.

I recall this case of Dr. Robitshek's very well. When I first saw it it was a circular excavated wound and to my recollection it was about 2 cm. deep. I very promptly passed the case on to Dr. Robitshek, who worked it out very nicely as you have seen tonight. You all know the difficulties in getting a surface over *x*-ray burns.

Dr. R. C. Webb: It appears to me that there is still a great deal of difference of opinion as to the value of the different methods of obtaining healing of a wound. When I was a medical student I recall one of Doctor Halsted's Friday clinics in which he spent the entire hour discussing this very problem, using a leg ulcer case as his subject. The field of surgery can be extensively discussed and demonstrated with an ordinary leg ulcer and it is remarkable how many previously unthought of points can be brought out by a master of the subject. The blue line which surrounds a healing wound is produced by a thin layer of epithelial cells which can be seen with the naked eye. There is also a line of epithelial cells extending inward over this raw area which cannot be seen and which must be considered and protected.

Previous to 1916 when Carrel brought this subject to our attention and placed it on a scientific basis we heard many methods of treatment advocated and when we stop and think we must remember that these were merely the guesses of the advocates. In general we hear more of the more dramatic surgical problems and many recent graduates know very little of the problem now being discussed. The controversy which accompanied the Carrel treatment obscured many of the valuable points brought out by him, which probably accounts for the continued guessing as to the value of various salves, etc. The formula worked out for Carrel by Du Nuoy furnished a method of eliminating guesswork. In 1917 at the Rockefeller Institute in New York, Carrel showed by using neutral soap that a wound when kept bacteria-free would follow Du Nuoy's curve. The problem of the healing of wounds was very acute during 1917 and often does not get the continued attention deserved.

Dr. H. O. McPheeters: This method of Dr. Robitshek's is very interesting. I think it was first brought out by Boynton. He would strap the foot and lower leg with strips of adhesive one inch wide, beginning at the toes and working upward to the knee. Each succeeding strip would overlap the last one by ¼ to ½ inch and would overlap in front. In this way he would make an adhesive cast for the entire lower leg and foot. This was left in place seven to ten days at a time, leaving the ulcer area bathed in a lake of secretions. Following this Nobl added the rubber sponge pressure to get rid of the coarse hydropic granulations. The adhesive accomplishes the same purpose though not so efficiently. About one year ago Nejorotti wrote a very good paper on this same subject.

The Minneapolis Surgical Society prize essay for 1929, "The Afferent Nerve Supply of Blood Vessels," was read by Mr. Miland Knapp of the University of Minnesota. (This paper will appear in a later issue of Minnesota Medicine.)

THE PRESIDENT'S ADDRESS

Dr. Stephen H. Baxter: It is with sincere appreciation that I acknowledge the honor of serving this Society as its President during the past year. Our Society is still young. Like a child who must pass through a period when nobody loves him but his mother, a Society cannot expect much recognition until it has acquired a little age—until some history is behind it—some record of accomplishment. It is confidently hoped that with the passage of time the members and officers who helped to found and establish it will feel an increasing pride in the part they played in its early history.

Time is essential to the growth of tradition. Character develops as a result of trial, of experiment, and of the final rejection of things that fail and the adoption of things that succeed. The Society has passed through several grades of education by trial and error and is gradually, let us hope, acquiring traditions and assuming some semblance of permanent character.

The plan proposed and put into operation by Dr. H. B. Sweetser at the beginning of his term as President two years ago seemed worthy of further trial during the year now closing. The attendance and interest shown in the meetings have, it seems to me, given evidence that the members approve of the plan of holding our meetings at private homes, where, without detracting from the value and interest in the scientific program, an air of informality and goodfellowship may prevail. In the name of the Society I wish to extend to the hostesses who have so graciously entertained us an expression of our appreciation of their hospitality.

The former dinner meeting held once a year, with a distinguished guest as speaker, has now become a tradition with us. These meetings are becoming increasingly successful and I hope that the custom will be permanent.

We have, then, some traditions, some character, sufficient history behind us to establish the right to live. But mere existence is not enough. There must be advancement, there must be growth, otherwise we must come under the operation of the law referred to in the parable and "from him that hath not, will be taken away even that which he hath." Is it too much to hope that from this Society there may emerge something of outstanding value to the science and art of Surgery?

We are sometimes inclined to be a little supercilious in our attitude toward surgeons of a hundred, or even fifty, years ago. "Hospital gangrene," wrote Samuel D. Gross, "owes its origin to a species of blood-poisoning depending upon a foul, infected atmosphere, operating upon a depraved and enfeebled constitution." Discussing dissection wounds, he says, "Of the nature of the poison nothing whatever is known. It is supposed that it is generated a short time before death, during the act of dying, or soon after dissolution, and that it is dependent for its development upon a vitiated state of the blood, though that state has not been pointed out. The poison is most virulent when it is communicated by persons dead of puerperal fever, erysipelas, carbuncle, pyemia, and other kindred affections." Quoting Gross again, "The causes of erysipelas are too numerous and diversified to admit of any very definite specification. It may be assumed that whatever has a tendency to disorder the digestive, hepatic or any other important function is capable of producing the disease—a vitiated state of the atmosphere—and whatever else has a tendency to weaken the corporeal faculties, may be enumerated as so many causes of the disease. Of the causes of anthrax or carbuncle, nothing whatever is known."

Such quotations from the writings of one of the greatest surgeons of his day invoke in us a feeling of complacent superiority, of indulgent self-satisfaction.

Dr. J. J. Woodward, a United States Army Surgeon in the Civil War, reported to the Surgeon-General that a microscopical examination of the slough in a case of hospital gangrene fails to reveal "any cryptogamic or-

ganism except the vibrios which are to be observed in every decomposing animal substance." It seems incomprehensible and almost inexcusable to us that these vibrios should be dismissed in such casual fashion, and yet I have no doubt that fifty years hence the same astonishment will be expressed over the Woodwards of our day who, having eyes, see not, or, seeing, do not perceive that which will have become obvious in the light of greater knowledge.

To whom do we owe the conquest of infection? To a chemist who used his eyes; whose first triumph came by the discovery that crystals of tartaric acid, which all other scientists had regarded as similar, were in reality dissymmetrical, that they could be divided into groups according to their form, and that solutions of the different groups had each its own peculiar effect on polarized light. This same faculty for observation led him out of the field of strict chemistry into the investigation of the processes of fermentation. A manufacturer of beet-root alcohol had had an inexplicable failure in some part of the process and asked the chemist to try to find the cause. He soon observed that the globules in the fermenting juice were of one shape when the fermentation was normal, but that they were of a different shape if the fermentation became lactic.

From these studies came as a natural consequence the investigation of the phenomena of fermentation and putrefaction in general, and in these investigations, to supplement the faculty of observation, the experimental method was employed. It is apropos at this point to quote the words of Pasteur himself in distinguishing the art of observation from the art of experimentation. "In the first case, the fact may either proceed from logical reasons or be mere good fortune; it is sufficient to have some penetration and the sense of truth in order to profit by it. But the art of experimentation leads from the first to the last link of the chain without hesitation and without a blank, making successive use of Reason, which suggests an alternative, and of Experience, which decides on it, until, starting from a faint glimmer, the full blaze of light is reached."

Although Science looks ever forward and has no place for complacent retrospection, it is at once a challenge and an inspiration to consider some of the great accomplishments of the past. The quotations I have given from Gross, and the classical paper by Holmes on puerperal fever with its reiteration time after time of the same story of tragedy following in the wake of ignorance, are sufficient to show us the contrast between the era preceding Pasteur and that following his discoveries. His epoch-making studies of fermentation and of the diseases of beer and wine led his admirers to think that nothing was impossible to him and, although he knew nothing about silk-worms, to him was assigned the task of saving the silk industry from destruction by a disease that had baffled all attempts to control it. With no precedent to guide him, he blazed his own trail and complete success was won only after five years of labor. Anthrax and chicken cholera, which also were diseases seriously affecting the prosperity of the agricultural districts, were studied, the cause discovered, and remedies found. During the investigation of chicken cholera came accidentally one of Pasteur's greatest discoveries, that of attenuated virus and its power to protect the body against subsequent inoculation with virulent micro-organisms. I have said that this discovery came accidentally; the combination of circumstances surrounding the discovery may have been accidental but "chance only favors the mind which is prepared." The use of attenuated virus was then tried for the protection of animals against anthrax and the story of these experiments and of the battle against prejudice and ignorance is one of the most interesting and dramatic in the history of medicine. The cause of furunculosis was demonstrated and a case of osteomyelitis, after a similar organism had been discovered in it, was described as "furunculosis of bone." Finally and most dramatic of all were the studies of rabies, culminating in the decision to try the new remedy, which had proven successful in protecting dogs, on a human being, and the name of Joseph Meister became immortal in medical annals.

I have said that it is at once an inspiration and a challenge to consider some of these great achievements of science. An inspiration because no problem in medicine of the present day is more baffling than was the problem of infectious disease before Pasteur. Our attempts to elucidate the cause of cancer are as satisfactory (but not more so) as were those of a former generation to understand the cause of tuberculosis. But there is also the challenge of problems to be solved in every department of medicine and surgery. From the earliest dawn of history, fractures have constituted the most obvious condition requiring surgical treatment, yet one of the principal endeavors of the College of Surgeons today is to attempt to standardize the treatment of fractures. The technic of intestinal anastomosis, elemental as that may seem, cannot be considered as perfected. No perfect method has been devised and the Journals still publish descriptions of new procedures. The true cause of diabetes is unknown. Banting and Best, it is true, have given us something more than "a faint glimmer" but it remains for future investigation to illuminate the problem with a "full blaze of light." With respect to cancer, we have hardly so much as "a faint glimmer" and yet the demand for a solution of the problem becomes more and more insistent. A glory equal to that of Pasteur's awaits him who can discover its cause and point the way to a really rational and scientific treatment.

Unexplored territory is everywhere around us and our Society can justify its existence and grow in strength and influence by encouraging excursions into these unknown regions. Let us, therefore, each of us, contribute his bit to the common fund of knowledge. Every fragment of truth has some value, and what may to one man appear only an isolated fact, may to another be that "faint glimmer" which can be fanned into the "full blaze of light."

The meeting adjourned.

THEODORE H. SWEETSER, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
205 W. 2nd STREET, DULUTH

THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

PREVENTIVE TREATMENT OF COLDS AND ASTHMA WITH VACCINES: Chandler Walker (Arch. of Med., Vol. 43, April, 1929, No. 4). Autogenous vaccines were made of every patient annually, in the autumn. Eight varieties of hemolytic and eight of non-hemolytic streptococci were found, in different patients. The types and proportions present of these varied considerably from year to year. These vaccines were pooled, this making an annual stock vaccine, representing strains of streptococci isolated from ninety-seven patients, thirty-seven of whom were children. Some of these suffered from recurring colds, while others were afflicted with asthma accompanying the colds. Eighty-four per cent required only one course of vaccine annually. Sixteen per cent were given a second course in the spring because of recurrence of infections. Reduction in the frequency and severity of attacks of colds and asthma occurred in 95 per cent of the cases. The best results were obtained in children who suffered from colds only; the least benefit was derived by adults who had asthma associated with colds. Children who had asthma with colds, and adults who were susceptible to colds only, obtained considerably better results than those cases in adults in whom asthma was associated with colds.

The mixed streptococcus vaccine contained 100,000,000 organisms per minim, or 1,500,000,000 per cubic centimeter. The treatment consisted of weekly subcutaneous injections beginning with 3 minims, and increasing 1 minim weekly for eight or ten weeks. If a dose caused much local or general reaction, it was repeated unincreased. For infants and young children the vaccine was diluted to one-half strength. Treatments were usually given in the fall and early winter.

THOMAS MYERS, M.D.

SURGERY

SUPERVISORS:

DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

THE URACHUS AND UMBILICAL FISTULÆ: R. Campbell Begg, Wellington, New Zealand (S., G. & O., Vol. XLV, Aug., 1927, No. 2, p. 165). The writer presents a very interesting record of the subject. The bladder in the 10 to 24 millimeter embryo is derived from the ventral cloaca and extends to the umbilicus. A narrowing of the upper part, as development progresses, forms the urachus. At birth the urachus reaches the umbilicus and is attached at the apex by three fibrous strands, one to each umbilical artery and one into the umbilicial cord. The bladder descent begins at birth, dragging with it the urachus and its attachments.

As a result of this process in the adult we have an average urachus of 5 cm. passing up from the anterior bladder wall just below the apex. The upper extremity is fully 11 to 12 cm. from the umbilicus, being connected, however, by a fibrous cord or Luschka's plexus.

The two features commonly described of the urachus: (1) that it reaches from the umbilicus to the bladder, and (2) that its canal is obliterated to form a fibromuscular cord. However, these are wrong in the adult. The urachal canal remains patent—in part at least—throughout life, being lined by transitional epithelial cells without a basement membrane. In 33 per cent of cases a direct communication exists between the bladder and lower urachus. In the others, though patent, the urachus ends blindly.

The blood supply of the urachus is generally from the left superior vesical artery. It can be traced to the apex of the urachus and along the allantoic remains to the umbilicus.

As far as anomalies go—extroversion of the bladder presents a typical picture of non-descent of the bladder and non-formation of the urachus.

Acquired urinary fistula at the umbilicus is never due to a patent or persisting urachus. The explanation lies rather in dilatation, pressure and sepsis of lower urachus, where it communicates with the bladder; a giving way and a leakage of urine along a linear channel bounded by transversalis fascia in front, the peritoneum behind and the obliterated fibrous hypogastric arteries on either side, to the comparatively thin partition between itself and the floor of the umbilical depression, where it may break through.

Congenital umbilical fistulæ are due to non-descent of

the bladder and failure to form a urachus. Only some 56 cases have been reported.

The author also presents a logical explanation for the separation of the umbilical cord in the new-born. The umbilical arteries, being ligatured an inch or two from the body, obliterate as far as the nearest collateral branch—the superior vesical arteries. The vein obliterates as far as the liver. Wharton's jelly having lost the nutriment supplied by the liquor amnii, and the arterial and venous coats being now deprived of the blood in their lumen, no life remains in the stump of the cord, and a line of demarcation appears at the skin which is provided with other arterial supply and a normal procedure is enacted.

CHARLES W. MAYO, JR., M.D.

LEFT VAGUS SECTION AND PARTIAL GASTRECTOMY FOR DUODENAL ULCER WITH HYPERACIDITY: Eugene Klein, New York (Ann. of Surg., XC, No. 1, July, 1929, p. 65). The theory of partial gastrectomy for gastroduodenal ulcer is based on two principles:

1. Removal of the ulcer and the area in which ulcers most commonly occur.
2. Free hydrochloric acid in the gastric contents is usually markedly decreased or eliminated.

He states the belief that gastrojejunal or jejunal ulcers rarely, if ever, occur in an anacid medium, and tabulates the phases of gastric secretion as follows:

a. Primary or psychic
b. Secondary or gastric
c. Intestinal
d. Continuous

Following partial gastrectomy, six months postoperative, 25 per cent of patients showed anacidity, 41 per cent hypoacidity and 17 per cent still had a hyperacidity.

In this last group of 17 per cent falls the recurring type of ulcer; the preoperative acidity has been high and they have been of the "nervous type."

As a means of dealing with the above group, section of the left vagus, which sends branches to the anterior half of the body and the fundus of the stomach, was done on the lesser curvature—this in combination with partial gastrectomy. It is a simple additional procedure and by putting the lesser curvature on stretch the nerve can be felt as an inelastic band. The primary and continuous phases of gastric secretion are thus believed eliminated.

Eight cases chosen because of marked hyperacidity done after the method described showed anacidity from two to five months postoperatively.

CHARLES W. MAYO, JR., M.D.

PEDIATRICS

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DIPHTHERIA FATALITIES WITH SPECIAL REFERENCE TO CIRCULATORY FAILURE: Joseph Grcengard, M.D., Chicago (Arch. of Ped., July, 1929, Vol. XLVI, No. 7). At the present time, diphtheria is looked upon as one of the medical problems whose solution has been practically accomplished. In spite of these facts, a considerable number of rapidly fatal cases of diphtheria are still seen, and the question arises as to the exact nature of the factors responsible for them. In an attempt to clarify this situation, an analysis of 116 fatal cases of various forms of diphtheria has been prepared for discussion.

The outstanding catastrophe in diphtheria at the present time is represented by the case evidencing what may best be termed circulatory collapse. In most instances distinct evidences of myocardial damage are apparent clinically and pathologically.

Warthin reported the pathologic findings in a series of cases in which the essential cardiac changes consisted in a myocardial degeneration due to the direct action of the toxin upon the cardiac musculature.

Harding presents still another explanation of the sudden fatal syncope on the basis of an oligemia, which is partly due to an actual diminution of the circulating medium, but is largely a distributive oligemia due to the collection of large quantities of blood in the dilated splanchnic plexuses. As a result of this oligemia, anemia of the medullary centers occurs. In addition to this, a peripheral circulatory factor undoubtedly exists and plays an important role in the sudden fatal syncope.

Definite increase in the size of the heart as noted on physical examination was found in 33 cases. The character of the heart tones was distinctly altered in every case, the tones being soft, blurred, and distant in contrast to the clear-cut snappy sounds heard prior to myocardial involvement. A definite, soft systolic murmur over the precordium was heard in 26 cases.

Among the disturbances of rhythm, gallop rhythm is of considerable importance in the diagnosis and prognosis of diphtheritic myocarditis. It was noted in 13 of these cases. In acute diphtheria the occurrence of gallop rhythm may be looked upon as definite evidence of myocardial involvement and as a grave prognostic omen.

The early and liberal administration of diphtheria antitoxin is the factor of prime importance here. It is to be noted that one-third of these cases received no antitoxin before entering the hospital and almost

another third were given some antitoxin, but much less than is adequate. In neglected, highly toxic cases, large doses of serum, 30,000 to 40,000 units, should be given intramuscularly as soon as the child is seen and repeated with smaller doses on the succeeding days, if no improvement is noted. Adrenalin plays an important role in the therapy of these cases and should be given hypodermically throughout the course of the illness. Strychnia and caffein are indicated as circulatory stimulants in these cases.

Fluids must be administered freely. The administration of glucose solutions has a distinct and lasting effect on the circulation. A 10 or 20 per cent solution of glucose is given intravenously, or by deep intramuscular injections into the thighs.

Once evidences of myocardial involvement have been manifest, the outlook is distinctly not good, despite any measures that are instituted.

R. N. Andrews, M.D.

MALIGNANT DIPHTHERIA: Philip S. Potter, M.D., Berkeley, Calif. (Arch. of Ped., July, 1929, Vol. XLVI, No. 7). Malignant is the designation applied to the very worst of the severe cases of diphtheria, such as may be due either to an extraordinary virulence of the bacteria or to a high degree of individual susceptibility.

Morgan suggests that the disease itself may be a bacteriemia and reports a case in which the diphtheritic bacilli were found in the heart's blood.

Malignant diphtheria may set in with such incredible swiftness and violence that all resistance is battered down and death takes place within 24 to 48 hours. The skin of the patient appears dusky and in some instances covered with small purpuric spots. The eyes are dull and from the open mouth or red swollen nostrils blood or blood stained serum may flow or hemorrhages may take place from various other mucous membranes.

The cervical lymph nodes and the cellular tissue of the neck are greatly swollen, sometimes to such an extent that the head is held stiffly backward. The soft parts of the pharynx are excessively swollen and in some instances the tonsils are so swollen that they push the elongated uvula either backwards or forwards.

The tonsils, uvula, pillars, palate, posterior pharyngeal wall and not rarely the soft palate are covered with a slimy grayish yellow or blackish membrane dotted with points of hemorrhage and in some instances the whole process becomess necrotic and gangrenous.

The uncovered mucous membrane is swollen, intensely red and also shows isolated areas of bleeding. The tongue is heavily coated with a brown or blackish slimy deposit. The breath has a dead smell and the mucous secretion is greatly increased.

The temperature may remain persistently high or it may be only slightly elevated, but as a rule it falls to or below normal by the second day. The pulse is very rapid, small and compressible.

As a rule the larynx and the trachea are not affected, or, if so, marked stenosis rarely occurs.

R. N. Andrews, M.D.

ROENTGENOLOGY

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TUMORS OF THE KIDNEY: B. H. Nichols, M.D. (Am. Jour. Roent., V, XXI, p. 582-588). The author uses the modified classification of Garceau (as published in 1909) and adopted by Chetwood, which seems most applicable to roentgenologic studies.

Any deformity of the renal pelvis or calyces may suggest the presence of a renal neoplasm, the location of which is indicated by the type of deformity or distortion. Tumors of the cortex either compress or elongate the adjacent calyx by compressing the infundibulum and this may result in dilation or obliteration of the distal end of the calyx.

A complete understanding of the gross pathology, together with the characteristic manner of growth, is most helpful in the roentgenologic diagnosis of renal tumors.

Hypernephroma.—Hypernephromata may be irregular in shape and nodular, in which case the shape of the kidney shadow will be affected, or they may be small and confined to the kidney cortex. When the tumor penetrates its capsule it may invade the kidney substance, branches of the renal vein or the pelvis of the kidney. Metastases through the blood stream occur usually in the chest, long bones or skull. They may occur in any portion of the body. These tumors may also metastasize through the lymphatics. In its early stage a hypernephroma is comparatively benign; hence the importance of its early recognition and removal.

Carcinoma.—The classification of carcinoma may be confused with hypernephroma. Carcinoma shows little tendency to displace the calyces or pelvis of the kidney. They are usually smaller, of much greater malignancy than hypernephroma, and extend to neighboring glands, but may metastasize to the lungs or the liver.

Sarcoma.—Sarcoma usually attacks capsule or perirenal tissue and thus does not produce changes in the renal pelvis but may be detected in the plate by irregularities in the kidney outline. In children they are a mixed tumor rather than a true sarcoma, and often attain large sizes, filling the entire abdomen. The

palpable mass is usually the first recognizable symptom as it rarely causes urinary changes.

Benign tumors.—These are rare.

Embryonic tumors.—There is no characteristic picture by which embryonic tumors may be recognized.

Tumors of the renal pelvis.—These produce deformity of the renal pelvis in their early stages.

Solitary cyst.—A benign condition which produces symptoms only by mechanical pressure.

Polycystic kidney.—Usually bilateral, polycystic kidney is probably a congenital condition and usually a familial disease. The encroachment of the cortical cysts on the calyces and kidney pelvis causes the visible changes and may be confused with deformity caused by other types of renal neoplasm.

Usually the history, urinary findings and cystoscopic observation, together with the comparison of function in the two kidneys, are necessary for a correct diagnosis.

Jacob Sagel, M.D.

RADIATION THERAPY IN THE TREATMENT OF SOME BENIGN AND MALIGNANT TUMORS; WITH PARTICULAR REFERENCE TO THE RESULTS OBTAINED AT THE RADIUM CENTER IN COPENHAGEN: Edv. Collin (Acta Radiologica. Vol. X, Fasc. 2., April 30, 1929, No. 54). A survey of the results obtained at the Radium Center following irradiation with radium and roentgen rays is made on 1,650 cases. These results are all based upon at least a five-year follow-up observation and treatment. Benign lesions such as angiomata, keloids, and warts respond very well to radium application, especially angiomata less than 2 to 3 cm. in diameter.

Malignant lesions about the face respond very well to radium as does cancer of the lip, the percentage of cures being 72 per cent and 74 per cent, respectively. No five-year cures are reported for malignancies of the esophagus, larynx, breast, thorax, rectum, or penis. The writer ascribes a large part of this to the fact that irradiation therapy is only of recent adoption in Copenhagen, and that at first only inoperable cases were sent to the radiologist.

It is pointed out that many cutaneous cancers which are resistant to roentgen rays will respond very well to radium therapy. Radium is used in preference to roentgen therapy whenever possible, and a combination of irradiation and surgery is carried out whenever indicated.

Harry Hillstrom, M.D.

LOBAR AND CENTRAL PNEUMONIAS IN CHILDREN: F. B. Stephenson (Am. Jour. Roent., June, 1929, 21:571). The author states that in all inflammations of the lung the primary physical reaction is congestion or engorgement of capillaries and is followed by infiltration of extracapillary tissue and exudation into the air sacs which manifest themselves on the roentgenogram as areas of increased density. This change, while usually due to the pneumococcus, may also be caused by other organisms.

A short description of the topography of the child's chest as compared to that of adults is given. Consolidation may progress from the periphery inwards, from within outwards, from below upwards or from above downwards, and may clear likewise or in patches. As to the term "central pneumonia," the application should be to that form which begins centrally in the hilus and extends out into the parenchyma for varying distances without reaching the periphery, in contrast to one beginning in the center of a lobe. The temperature course is so often atypical as not to be dependable for diagnosis. Fifty-two and a half per cent of his series of 100 cases had complications, with otitis media at the head of the list in 30 per cent of the cases, and empyema second with 8 per cent.

The average duration was 7.4 days. The minimum was three days and the maximum twelve days. The age varied from two to sixteen years. The ratio of males to females was 6 to 4.

The author concludes that many inflammations in the lungs resemble the early stages of lobar pneumonia, which do not result in clinical lobar pneumonia, and this fact should be borne in mind in the interpretation of chest films.

Jacob Sagel, M.D.

BACTERIOPHAGE AS A THERAPEUTIC AGENCY

The bacteriophage has been slow to gain acceptance as a possible agent in the warfare against infection. Recent investigations show the many difficulties connected with the successful use of bacteriophage and also the advantages which they have over other agents. While bacteriophage preparations give promise of eventually becoming valuable additions to the physician's armamentarium, it should be remembered that the whole subject is still in the experimental stage. When vaccine therapy was new and in the ascendency, manufacturers offered specific vaccines for almost every human ailment and "mixed vaccines" of startling complexity. The Council on Pharmacy and Chemistry not only rejected most vaccine mixtures but has during recent years been obliged to omit a considerable number of simple vaccines because the results obtained with them did not measure up to the evidence which investigators supplied in the height of enthusiasm. Manufacturers are already marketing bacteriophage preparations, simple and mixed. Warrant for the use of such mixtures has not so far become evident and the Council on Pharmacy and Chemistry has postponed the acceptance of simple preparations to await further evidence in favor of their usefulness. (Jour. A. M. A., July 13, 1929, p. 121.)

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THE TREATMENT OF DIABETES MELLITUS*

Elliott Proctor Joslin, M.D.
Boston

THE incidence of diabetes may be on the increase, but the increase is at the old age end of life. In Massachusetts more diabetics die over the age of eighty than under the age of thirty, and in the United States more succumb to the disease above the age of seventy-five than under the age of thirty-five. Since the introduction of insulin, diabetes has decreased for all males in Massachusetts up to the age of sixty years, and for females up to the age of fifty years. The only group in the community responsible for an increase in diabetes is composed of women, fat women, especially negro women, and only women above the age of fifty years.

The prognosis of diabetes has changed. Today it is the young and not the old who are increasing the average duration of life. Deaths from diabetes in children appear to be almost needless. In two years only six in a series of 300 and over have died, but in the twelve months which will end in July the mortality will be a little greater. Deaths among children we know are avoidable because diabetic children die only as a result of diabetic coma and today diabetic coma is a preventable and avoidable disease. This fact, therefore, makes it all the more important that every physician in the United States be alert not only to detect coma but to be trained in its treatment.

Diabetic coma nearly always comes on unexpectedly to the uninitiated, but nearly always can be predicted by the experienced patient or doctor. Diabetic coma results from overeating protein and fat and too little carbohydrate. Usually it appears because the patient overeats food—in other words breaks the diet. Frequently it occurs because the patient overeats himself, due to fever or disease of the thyroid gland. Furthermore, every patient who takes insulin and thus has increased his diet is really eating more than his own pancreas will allow. Consequently when patients omit insulin they are apt to develop coma unless their urine remains sugar-free.

Diabetic coma is a disaster and one of its most common causes is the giving up of insulin. Patients, somehow or other, and doctors too, get the mistaken idea that if they are to stop eating they are to stop taking insulin. This is absolutely wrong. Diabetic patients who take insulin should never give up the insulin if the urine contains sugar. One must not forget that sugar can be formed out of the protein and fat which make up the body and if this sugar is not burned the fat and protein will not be completely burned either and coma is inevitable. Don't forget the old simile—a diabetic is walking on insulin stilts. Take away the insulin and he falls to the ground. Only last week a girl came into the hospital in diabetic coma, because, when she had a pain in her abdomen, her doctor not only stopped her food but stopped her insulin. She was a trained diabetic of seven years duration and when I asked her why she broke all the rules and stopped her insulin she replied, "My doctor told me not to take it." What could I say? Her doctor was one of our very best country practitioners of the old school—just over sixty years of age. All he needs is education and I have arranged that he be given an invitation for private instruction in the Clinic in the use of insulin and the modern treatment of diabetes. But I am losing less diabetics from this type of doctoring. Already seven years have rolled by since the discovery of insulin and as doctors only practise about thirty years and usually die at sixty, one-fourth of the

*Presented in symposium before the annual meeting of the Minnesota State Medical Association, Saint Paul, May 14, 1929.

doctors most dangerous for diabetics are now out of business or dead, and those left either grew up with insulin or are young enough to understand its use.

The differential diagnosis of diabetic coma is puzzling and is most frequently confused with an insulin reaction. Usually it can be made over the telephone and the prompt treatment instituted saves the life of the patient or hastens recovery to an unbelievable degree. Diabetic coma always comes on slyly and slowly during days; an insulin reaction develops suddenly, in minutes rather than hours. Diabetic coma is preceded by too much food, be it that of the table or the body as the result of an infection or hyperthyroidism; an insulin reaction from too little food. Coma comes from too little insulin; a reaction from too much insulin. Coma is normally preceded or accompanied by an infection but this is practically never the case with the insulin reaction, because an infection makes a diabetic worse and he needs more insulin. These four points surely are enough for a decision. But I must emphasize the frequency of pain in the abdomen, vomiting, fever, dry skin, exaggerated respiration, air hunger of the coma patient—all of which are lacking in the one with an insulin reaction. The coma patient looks sick and extremely ill; the patient with an insulin reaction appears weak and faint. With the one patient sugar and acid are found in the urine, but in the other not unless by chance the bladder has not been emptied for some hours. An accurate diagnosis is worth while because treatment must be instant.

The treatment of the coma case is a serious problem for you and me, because all uncomplicated cases of coma should recover, and should a single one die, someone will ask you or me, "Why?" Among 105 attacks of coma in ninety patients reported from the Joslin Diabetic Unit this month in the Medical Clinics of North America, there were two uncomplicated coma deaths, patients treated in 1923, five coma deaths with complications and seven coma patients recovered from coma but died from complications unrelated to coma before they left the hospital. Since this review we have had one coma case in a pregnant woman who gave a history of twelve dead babies. She came out of coma and Dr. Titus, two months later, presented her by cesarean section with her first living child, and that her thirteenth. She had an alert and modern country doctor—Dr. Kilbourn of Groton—who spotted her coma early and sent her to the Deaconess Hospital for treatment.

The treatment of diabetic coma is so filled with action that it would made a modern movie. Once the diagnosis is settled it is (1) insulin 10 to 40 units or more every half hour until beginning recovery, by physical examination or catheter urinary specimen, is apparent; (2) salt solution preferably subcutaneously, perhaps intravenously and incidentally by rectum after a cleansing enema; (3) stimulation to the limit by caffein sodio benzoate up to 35 grains in half a day; (4) lavage of the stomach nearly invariably in children and usually, but very cautiously, in adults; (5) stick to the patient until he not only recognizes you but knows enough to thank you for saving his life. As for alkalis, I suggest you defer their use until someone publishes 105 comas with less than two uncomplicated deaths, or 21 cases in children without a single death, as occurred in the series soon to be published by Blackfan and his coworkers at the Children's Hospital in Boston. One of our cases prior to recovery had a blood sugar of 1.620% and one patient was seventy years of age.

The pathology of diabetes is being rewritten and before the end of the year I hope Shields Warren at the Deaconess Hospital will bring out his monograph. You all know the hope diabetics get from various autopsy demonstrations that regeneration of the pancreas is proved to have taken place in the young. Dr. Warren will record regeneration in one of my cases who after some fourteen years of diabetes developed cancer of the pancreas, and the uninvolved portion of the gland showed regeneration. That encourages me very much, but I always have found encouragement in the gains of tolerance for carbohydrates which five of my cases whom I have followed for seven to eighteen years, have shown. The facts will be found in the April number of the *Annals of Internal Medicine*. Suffice it to say that these patients were once severe diabetics, but now with the help of insulin they have gained weight, increased their calories and reduced their insulin somewhat. I would not have them omit it until the carbohydrate in the daily diet reaches 300 grams. All of us eat about 300 grams of carbohydrate; that is the diet of

health; that is the diet with which the metabolism runs most smoothy. Therefore, until these my old trusted patients reach that level, I shall not take away the support which has brought them thus far on their journey.

What is the diet of a diabetic today? It can be described simply.

Essentially all adult diabetics are fat and therefore it should be a diet limited in total calories, a diet for the obese.

(a) Most diabetics are above the age of forty and the great majority above the age of fifty years, and no one recommends that such individuals should increase their protein, but on the contrary recommend its decrease as age advances—a diet therefore for the mature and aged. But that leaves us with the decision to reach as to whether we shall give them a high fat low carbohydrate diet, or a high carbohydrate low fat diet. Which would you adopt if while still in health you were obliged to choose? Of course you would choose the diet which nearly approximates the diet of those in health about you—namely more carbohydrates than fat. And so I see it for my diabetics. Let them go to no extremes, but with moderate doses of insulin live sugar-free and as nearly like their healthy brothers as they can. As a matter of fact, if you guard against overfeeding of calories and overfeeding of proteins, no matter the diet with which you start, your patients eventually, I believe, will gain tolerance for carbohydrates unless you go to bizarre degrees in low carbohydrate and high fat.

Diabetic patients must be given a chance to show their latent tolerance for carbohydrates. A boy cannot swim until he goes into the pond. It is ridiculous to expect otherwise. If diabetics are constantly kept on low carbohydrate diets they may be in the position of a healthy nurse years ago who assumed for me the role of a diabetic of the Allen fasting era. When at the expiration of two weeks she returned to her full diet, her blood sugar bordered on that of a diabetic. Odin showed healthy students living on the high fat diet of the Petrin Clinic later developed hyperglycemia when they added the carbohydrate of a grapefruit. Sweeney has shown the lowered tolerance for glucose produced by a high fat diet. Adhsburg and Porges have recorded similar results. I know wives of two diabetic doctors who have been so conscientious that they have adopted diets akin to that of their husbands, and their blood sugars have reached diabetic levels, but I question if they would be called diabetics. If a normal person with a good pancreas loses tolerance for carbohydrates on a low carbohydrate high fat diet, how about the possibility of a diabetic likewise doing so with his less efficient pancreas?

Don't misunderstand me! All diabetics should be sugar-free, should avoid overweight and with advancing age too much protein. If extremes in diets of carbohydrate and fat are avoided, they will surely gain tolerance for carbohydrate if allowed to demonstrate it. Don't ask them or expect them to gain but a gram a month and maybe not that the first year, but rest assured that the second 10 grams gained will be more easily accomplished than the first because "to him that hath shall be given."

Arteriosclerosis is still the specter which stares the diabetic in the face. It brings him premature old age, but I believe not so readily as formerly. A generation ago he did not live to grow old because coma clipped the threads of life, but now with coma vanquished he lives and must learn to fight arteriosclerosis in the legs, the heart or brain, and, strangely enough, in the kidneys least of all. His is a different kind of disease of the arteries than that of senile sclerosis, syphilitic sclerosis, and quite unlike that of Buerger's disease. If it is constitutional in character and related to cholesterol, there is a chance to beat it, because with insulin and the higher carbohydrate diet which it allows, cholesterol deposits appear to form less readily.

Arteriosclerosis is more universal in diabetics than many suppose. Autopsies and biopsies furnish the best evidence of it, and close to these means comes the roentgen ray. One hundred or more of my patients are living to attest its presence by the loss of a toe or foot or extremity, and not long ago my associate Dr. Root counted some 180 living and dead who had definite angina pectoris. For the treatment of the legs we have learned not to procrastinate and we should follow the same rules with the heart. Upon the average I venture the statement that following amputation or following angina symptoms the duration of life is barely two years. It can and should be longer, and just as we have a wandering diabetic nurse who travels about to keep our diabetic children alive, now we have a wandering

diabetic nurse to preserve the lives of our patients who have undergone surgical treatment for the feet. The capital expended upon these two groups of patients has been so great that we are seeking to preserve it. An investment in diabetic children can be made productive; the investment in these maimed diabetics whose feet have been lost through hardening of the arteries is to protect them from pain and in some way or other to make their lives less a burden to their families and in some cases to make at least a few of these lives an asset. By a study of this latter group the immensity of this sclerotic problem will be better realized and then it will be possible to attack it from the proper angle. Already we note than the trained diabetic washes his feet every night and carefully avoids anything that might wound them and thus admit infection.

DENATURED VACCINES

One of the basic hypotheses of vaccine therapy is the assumption that the artificial immunity produced by killed cultures, bacterial autolysates and other microbic products is necessarily specific for the living micro-organisms from which the vaccines were obtained. Nevertheless, commercial exploitation almost invariably overlooks or neglects the fact that such vaccines, while demonstrably antigenic, may be so altered in specificity as to be inoperative against the living micro-organisms. It has been found that bacteria treated with certain chemicals "may be changed so that new antigens are formed to which rabbits respond by the production of antibodies specific for the altered bacteria." These antibodies, which are "different from those formed for live organisms, were not demonstrated to be bactericidal for live bacteria." (Jour. A. M. A., August 31, 1929, p. 697.)

BLOOD SUGAR TESTING OUTFITS

The various blood sugar testing outfits on the market are, for the most part, satisfactory for clinical work, especially when one wishes to follow the blood sugar values from time to time. None of these instruments are as reliable as the special methods advanced in the literature, but most of them are based on the principles of these tests, so that the difference is largely one of degree of accuracy of the results. If one uses the same instrument or method on different specimens of the patient's blood, whatever error there may be in the outfit or method employed is introduced at each testing, so that the results obtained are comparable. It is hard to see how the Sheftel sugar test can yield anything more than a rough estimate of the sugar contents. The claim of a percentage of error of less than 0.1 per cent is so ridiculous as to throw discredit on the originators. (Jour. A. M. A., August 3, 1929, p. 403.)

DIABETES IN ITS RELATION TO SURGERY*

George P. Muller, M.D.
Philadelphia

IN 1891, Treves stated that, "Diabetic gangrene of the limb is scarcely within the scope of surgical measures; an amputation in such a condition is almost invariably fatal." But Spencer, in 1892, and Godlee, in 1893, advocated operation as a means of removing septic products which may cause or aggravate the glycosuria.

The pre-operative preparation of diabetics with gangrene is not new. In 1895, Gussenbauer advocated diet and general treatment before amputation. In 1902, Phillips showed how the mortality could be reduced by pre-operative treatment. Incidentally, his article brings the subject up to date for that time.

During the next twenty years, the literature is rich in papers dealing with this subject and with the discoverey of methods for determining the blood chemistry. Rapid progress was made in our knowledge of the diabetic ketosis causing coma. Sodium bicarbonate came into vogue and was used so indiscriminately that Joslin suggested that a patient threatened with diabetic coma might be sent into actual coma by the careless administration of alkalies.

During this period, the pre-insulin time, or, as Joslin terms it, the Naunyn time, certain principles governed the surgeon and they are well summarized by Seelig:

"In the first place, it was recognized that diabetes was a disease varying in severity from the mild to the severe, and that the results of surgical interference were measurably proportionate to the grade of the disease. It was regarded as true von Noorden's axiom that: Every diabetic is, emphatically, less resistant to trauma (including surgical trauma) than is a non-diabetic patient. It was known that anesthesia was a precipitant factor in the production of coma, that wound healing was proudly affected by a high blood-sugar content, that wound infection was to be feared, and that immunity to infection in general was low in diabetes. Finally, and most important of all, it was known that not only were special tissues compromised, but also that the organism as a whole was weakened by diabetes. The frequency of endarteritis, myocarditis and neurotrophical disturbances, the not uncommon loss of weight, and the frequent existence of nephritis were facts of common knowledge to the surgeon."

And so things stood, nearly all surgery in diabetics being that of necessity, until the introduction of insulin. Since then, to paraphrase Joslin, the surgical diabetic is the serious diabetic, the diabetic who dies, the one with the most complications, and yet insulin and concurrent surgical and medical effort have won unlooked for victories.

By a surgical diabetic, I suppose we mean a patient who is to be subjected to an operation, either for a condition concurrent with the diabetes, such as gangrene or carbuncle, or for some infection, such as appendicitis or gallstones, occurring in the diabetic. It seems to me that in the latter we must sharply distinguish between the emergency and the elective groups. In the case of the rapidly progressing acute appendicitis, a perforated duodenal ulcer or an obstructed hernia, if the patient is not in coma, the diabetic state should be disregarded, except that ether should never be used for anesthesia, and the diabetes treated after operation.

On the other hand, operations for chronic appendicitis, simple gallbladder disease, ordinary hernia, which is resistant to truss treatment, etc., should not be done until the diabetes is under perfect control. The surgeon should understand the influence of carbohydrate starvation, diarrhea, vomiting, infection, anesthesia, fever, hyperthyroidism, etc., in producing acidosis and be familiar with the simple remedies useful in warding it off—water, orange juice, glucose intravenously and insulin. Strict control, with blood chemical tests and the advice of the medical colleague, is essential.

In the milder diabetics, no trouble will be experienced if water is freely given up to six hours before operation, and then about 200 c.c. of orange juice and 10 units of insulin adminis-

*Read in symposium before annual meeting of the Minnesota State Medical Society, St. Paul, Minn., May 14, 1929.

tered. In the severe cases, consultation with the medical collegue is advisable. Ethylene gas anesthesia combined with local novocain infiltration can be used for most abdominal operations, although lately I have been using spinal anesthesia. The latter is preferred for amputations, and gas for the carbuncles.

As most middle-aged diabetics are arteriosclerotic, the problem of gangrene becomes the most important of the surgical complications of the disease. The determining of the degree of occlusion and the efficiency of the collateral circulation are not easy. We have tried various methods, but mostly depend upon the color reaction, after raising and then lowering the leg, together with the local temperature to the hand. The presence or absence of pulsation in the dorsalis pedis, popliteal and femoral vessels should, of course, be noted.

I have been unable to distinguish between the arteriosclerotic and diabetic types of gangrene. My colleague, Dr. Eliason, in a recent review, found that the onset of gangrene occurred about a decade earlier in the diabetic than in the non-diabetic. Aschoff believes that the obesity with consequent vascular strain and the increased blood lipoids, notably cholesterol, encourage premature arteriosclerosis.

The influence of age is largely that of arteriosclerosis, Lemann showing that the occurrence of gangrene was negligible in those under forty, whereas in ward patients over sixty years gangrene occurred in 31 per cent of the diabetics.

But in addition to gangrene of a type comparable to the senile gangrene in the non-diabetic, the diabetic patient frequently has the added increment of infection. Most writers agree that the local power of resistance in the diabetic is diminished. Portals of entry are easily provided and, as infection is followed by the defensive mechanism of inflammation with serous and cellular exudate, this pinches still further the blood supply with consequent necrosis and tissue death. In some cases punched out ulcers resembling trophic ulcers may occur, usually located on the sole of the foot just back of the head of the fourth metatarsal bone, or medially at the base of the great toe. In others a local gangrene of the toe may have behind it a necrosis of the tissues of the foot burrowing around the tendon sheaths and well up on to the dorsum or under the plantar fascia. Or, a spreading gangrene of the foot may steadily develop.

The local treatment of these gangrenes and infections depends entirely upon the circulatory response and the reaction of the patient to the septicemia. Any marked febrile reaction associated with constitutional symptoms should lead to the diagnosis of sepsis. The absence of sepsis and the ability to control the diabetes allow the surgeon to treat an infected toe or a gangrene just as in the non-diabetic.

This comprises: (1) the standard surgical treatment of the local process such as debridement, incision and drainage, wet dressings, elevation, etc.; (2) circulatory exercises, baking, ultra-violet rays, etc.; (3) control of the metabolism. A toe may be amputated when the gangrene localizes, or the foot or leg may be removed when the gangrene spreads. The site of amputation can be governed by the rules well known to all surgeons.

On the other hand, if sepsis has occurred, or develops during conservative treatment, and especially if it has spread beyond the toes, I believe that immediate amputation through the thigh or just below the knee is indicated. If there is a good dorsalis pedis pulse we may try an extensive debridement and the perfect application of wet dressings for a few days to note results. With a cold foot, such treatment is useless.

I do not think that there is a great deal of difference in the mortality between the leg and thigh amputation if the indication has been properly selected. I do not like the Stokes-Gritti method when infection is manifest, as the wound must be closed without drainage and usually the lymphatics streaming up from the foot are carrying infection. A safe leg amputation can be done only in the absence of edematous tissue indicating infection. If the muscle is gray, the surgeon should at once go above the knee. I do not believe in vessel ligations, or periarterial sympathectomy. In severely infected cases demanding a thigh amputation, we ligate the femoral separately in Scarpa's triangle and pack the stump. In some cases, the guillotine method seems justified to save time.

In my experience amputation for gangrene is too often delayed unnecessarily while treating

the diabetes. We have evidence of this in our own series. The average diabetic can be controlled more easily after amputation than before, and ordinarily the danger of acidosis from the operation alone is not great if spinal anesthesia be used and sepsis avoided. Certain factors should be remembered. Most old people cannot successfully use an artificial leg, and hence a thigh amputation makes them more comfortable. Some patients do better with early amputation for economic reasons.

It is much better to prevent, than to cure by mutilating methods, hence *all* diabetics must be taught the need for scrupulous cleanliness in the care of the feet, rigid avoidance of the slightest trauma, and the use of postural exercises. Extreme degrees of heat and cold should be avoided, especially when bathing, and the feet well protected by woolen socks in the winter. At the first sign of infection or injury, the patient should consult his physician and never attempt home remedies.

Carbuncles and other localized acute abscesses in the diabetic should be treated at once by surgical incision and drainage. They can only aggravate the diabetes and nothing is gained by delay except that, in cases of mild or moderate grade, poulticing may be advisable to help the surgical cure. The patient with carbuncle is in the septic group, the worst class of diabetic, and the mortality is high. Hence the need for quick removal of the infected necrotic mass and the institution of vigorous eliminative methods, and, of course, diabetic control treatment.

THE ACTION OF DIGITALIS IN HEART FAILURE

Clinicians have generally accepted the pharmacologic evidence that digitalis causes a more vigorous and larger ventricular contraction. But it is difficult to accept the view that a muscle such as the heart, which cannot rest after being overstimulated, is improved by being forced to beat harder. It has now been shown that the efficiency of the heart, or its capacity for doing a fixed amount of work with least oxygen consumption, varies inversely with its diastolic volume. It was shown further that digitalis causes the heart to decrease its diastolic volume while carrying a constant load. Thus, digitalis reduces the energy requirement of the heart or permits it to do more work with the same expenditure of energy. (Jour. A. M. A., August 17, 1929, p. 548.)

ACQUIRED POLLEN HYPERSENSITIVENESS

In order to account for acquired pollen hypersensitiveness, clinicians usually assume that at some previous time the patient has inhaled, has swallowed or has otherwise been inoculated with a specific pollen. According to this hypothetic etiology the patient should be equally hypersensitive to the individual proteins of this pollen, assuming, of course, that these proteins are all equally antigenic. That such patients are not thus equally hypersensitive appears from recent work. This work throws doubt on the common assumption that acquired pollen hypersensitiveness is due to previous exposure to a specific pollen, and equal doubt therefore on the rationale of current methods of antiallergic therapy. (Jour. A. M. A., August 31, 1929, p. 697.)

GLYCOSURIA IN LIFE INSURANCE EXAMINATIONS*

Henry W. Cook, M.D.
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IT is most pertinent that the Society should have presented before it a symposium on diabetes, for the disease is increasing rapidly in spite of modern treatment, and becoming a more and more serious factor in both general and insurance mortality. We are certainly peculiarly fortunate that the opening of the subject should be by so eminent a clinician and specialist as Dr. Joslin. It is readily understandable that anyone who attempts to follow Dr. Joslin in a presentation of diabetes must do so with much hesitation as to the value of the contribution he may make. Insurance medicine has, however, made some very real contributions to the subject, and, besides, views it from a somewhat different angle than does clinical medicine, so that I feel I may venture to give you briefly some experience with diabetes from the viewpoint of insurance medicine and some opinions based on this experience which I trust may at least have suggestive interest for clinical medicine.

In the first place, statistical medicine has a most pessimistic message for the immediate outlook in the control of diabetes, not the individual case under the care of Dr. Joslin or men of similar training and experience, but for the disease as a factor in morbidity and mortality.

The profession and the laity hailed the discovery of insulin and its brilliant results in carefully treated cases as not a cure, of course, but as a treatment which should immediately control the ravages of the disease. However satisfactory the treatment may be in a certain individual case, the fact remains that the increase in the incidence of mortality of diabetes has not been in the least affected by the discovery of insulin, now six years ago, but, has gone on apparently as though insulin had never been discovered. The following table shows the death rate from diabetes for the past twenty-seven years.

(Census report United States Registration Area.)

1900	9.7
1905	12.9
1910	14.9
1915	17.5
1920	16.1
1923	17.9
1926	18.0
1927	17.5

You will note that the year 1923 and the years following the discovery of insulin show no results of the discovery in mortality improvement. I know of no more discouraging fact than this. We knew that proper treatment, either with insulin, or without when diet alone suffices, can control a very large majority of cases of diabetes. Yet it is obvious that the people of this country are not receiving such treatment in sufficient numbers to modify appreciably the previous mortality trend. There can be only one answer: that diabetics in the mass are not receiving adequate or proper treatment. This is a matter of the greatest professional, economic, and social importance, and it should be met by the combined forces concerned.

An active educational campaign is vitally necessary, directed not only for the laity, but for the profession. There are some 100,000 deaths annually in this country from tuberculosis, and millions of dollars are contributed and spent for its control. There are perhaps 25,000 deaths from diabetes annually—the disease is now much more amenable to proper treatment than tuberculosis, and yet practically nothing is being done to educate the public to early diagnosis and adequate treatment, and the profession must be sadly temporizing in applying the treatment in cases coming to them. A careful investigation and analysis by the Metropolitan Life Insurance Company showed that during one year among their policyholders who died of diabetes, one-half had not been given insulin until within one month of their death, and that not

*Presented in symposium before the annual meeting of the Minnesota State Medical Association, Saint Paul, May 14, 1929.

less than 17 per cent had received the first dose of insulin on the day of their death. This can only mean that the disease was unrecognized or proper treatment not used until the case had become toxic and hopeless.

Neither the laity, nor the physician has yet come to give to diabetes the serious, the studious, and the painstaking care which its treatment requires. Two weeks ago I talked with a professor who is carrying the work of an exacting department in a southern academic college—in perfect health apparently, active in athletics, feeling vigorous, eating a rather general diet carefully calculated for caloric value and with restriction of sugar—and whose urine is practically sugar-free with a night and morning dose of insulin. But to show the nice balance that is maintained: two years ago he went to a party, ate somewhat more freely than usual, was tired on reaching home, and, through carelessness or forgetfulness, did not take his insulin. About 2 a. m. his wife was awakened by his heavy breathing, and found she could not rouse him. The doctor was called and was afraid to administer insulin, not knowing whether the evening dose had been omitted or perhaps an overdose taken, for an overdose may produce similar symptoms. He had to catheterize and examine the urine and get a blood sugar before he felt justified in giving the insulin. The effect was magical, the man awakening in a short while as from a sleep and wanting to know what was the matter. This man has become a rather expert dietitian in the study of his own case and is, I am afraid, better equipped to guide his diet scientifically and successfully than many practitioners. Unfortunately, many physicians do not appreciate the painstaking study which is essential in guilding the diabetic's diet. Such general instructions as are sometimes given to "cut out sugar," "reduce bread," or "use gluten bread," etc., etc., are inadequate substitutes for a knowledge of food values and a meticulous application of this knowledge to diabetes, and especially the peculiar problems of the individual case.

State and city health departments, medical societies, and privately supported health agencies should make a determined effort to control diabetes as tuberculosis has been controlled. If more is not done in this direction, in ten years diabetes will have a larger annual death toll than the "white plague."

The following facts must be reiterated until the public and the profession are fully awake to the problem:

1. Diabetes is increasing and causing 25,000 deaths annually, and 100,000 more or less severe invalidisms.

2. Periodic examination with urinalyses is the only way of making the earlier and more hopeful diagnoses.

3. The pre-diabetic stages are symptomless and depend for recognition on chemical analysis.

4. Diabetes is overwhelmingly common in middle age in overweights. Overweights who eat excessively of sugar and starches are prospective diabetics.

5. Every one who has or has had glycosuria is a possible diabetic and should have prolonged and careful study, especially a blood sugar study.

6. A case of established diabetes requires for lifetime daily care in treatment. Carelessness, neglect, and belief that insulin has "cured" the disease, are responsible for a large majority of the 25,000 annual deaths from diabetes.

As a natural reaction to the past few years of propaganda for periodic physical examinations, we not infrequently hear criticisms, both lay and professional, of the superficiality and inadequacy of the usual health examination. But let us keep in mind that for the early discovery of the pre-diabetic and the diabetic alone, the periodic examination would be worth while. It is the only possible way this disease can be discovered in the most amenable stage.

For the public, diabetes presents two problems: (1) Avoidance of overweight and excessive ingestion of starches and sugars; (2) periodic urinalysis.

For the diabetes patient may be added a third consideration—the unwelcome conviction that the disease is probably incurable, but entirely compatible with a normal life and even a normal life expectancy, under persisting adequate and competent treatment.

For the profession, diabetes presents more difficult problems. When is an individual who has or has had sugar in the urine a diabetic? This is also the major problem of insurance medicine.

Both clinical medicine and insurance medicine have swung the pendulum through extreme positions on this problem: "All normal urine has a little sugar and it is negligible unless in large

amounts and accompanied by symptoms of diabetes," or at the opposite extreme: "All glycosurias are diabetics or prospective diabetics."

A reasonable middle-ground has developed the device of the term "renal glycosuria"—individuals who occasionally show glycosuria but in whom careful observation develops no evidence of diabetes. These distinctions are, however, extremely difficult, and it is interesting to note that in a long experience the Mutual Life of New York found that deaths from diabetes were six times as frequent in a group of carefully selected "renal glycosurias" as in their general experience, although super-selection had in this group given a favorable mortality experience. This experience is confirmed by that of the New England Mutual and other insurance companies. Furthermore, the Mutual Life's study shows that their favorable mortality was due entirely to the experience of the first five policy years. After five years the mortality was 25 per cent in excess of the company's general mortality, and after ten years 52 per cent in excess.

That glycosuria is a frequent and relatively unimportant finding is not indicated by the study of the New England Mutual, when in 7,000 consecutive urinalyses only 367 showed sugar in an appreciable quantity, but only 173 of these 7,000 specimens showed sugar in an amount over 0.3 per cent. Numerous investigators have pointed out that it is dangerous to make a diagnosis of renal glycosuria until the patient has been under observation for some years. The careful blood sugar studies by the New England Mutual proved that the blood sugar showed as unfavorably in those cases with a past history of glycosuria and present normal urine, as in the cases which showed glycosuria at the present examination. This indicates the danger of regarding as accidental, or of accepting for insurance, cases with a past history of sugar merely on the evidence of present normal specimens of urine.

Holst has stated that in a thorough study of 163 cases of glycosuria in applicants for life insurance, 30 per cent were definitely diabetic. We do not know how many of the remainder ultimately became diabetic, but from the Mutual Life's experience we can assume that many did. In addition to deaths from diabetes being six times as frequent in this group, deaths from heart disease were twice as common.

In a problem such as this, "When is glycosuria diabetes?" it is impossible in the present stage of our knowledge to define absolute standards 100 per cent correct. We know that many "renal glycosurias" so diagnosed die of diabetes. We also know that many glycosurias have been wrongly treated as diabetics when the glycosuria was alimentary, due to pregnancy or temporary conditions, and under the most careful methods mistakes will undoubtedly continue to occur; but their number can be materially reduced by careful study and sufficiently prolonged observation. Certainly we can say that no glycosuria should be considered negligible without such study and observation. The standards set up on the basis of urinalysis alone by Drs. Benedict and Folin for the Metropolitan, I believe are far too liberal, *i.e.,* that if the specific gravity is 1.015 or less, 0.2 per cent or less of sugar may be accepted as normal, and if the specific gravity is 1.025 or more, sugar up to 0.3 per cent may be accepted as normal, in the absence of other information indicating diabetes. There is every reason, from clinical and insurance standpoint, to feel certain that a group of cases showing 0.3 per cent sugar will contain a large number of active or prediabetics.

While absolute standards are difficult, it is necessary that the physician as well as the medical director should have some guide to a reasonably safe decision in an individual case. I suggest the following:

All glycosurias of 0.1 per cent or more should be regarded "suspect." If after 100 grams of glucose the urine remains sugar-free at one and two hour intervals, the previous finding may be disregarded. If after the 100 grams of glucose the urine shows sugar, a blood sugar test should be made one, two, and three hours after ingestion of 100 grams of glucose. If the blood sugar tolerance test does not show over 130 mgs. blood sugar, the case can probably be considered nondiabetic; if the blood sugar goes from 130 to 150 mgs., the case should be moderately rated for life insurance and kept under clinical observation. If the blood sugar goes above 160 mgs. the group will show a very high percentage of true diabetics. A delay beyond two or two and one-half hours in the blood sugar curve returning to normal is further evidence of disease.

Having established a presumptive diagnosis of

non-diabetic glycosuria, the physician should most certainly give the patient the benefit of the doubt and advise a periodic urinalysis and moderation in the use of starches and sugars, and especially should control the diet toward excessive gaining of weight. If the presumptive diagnosis is diabetes, a studious, painstaking treatment must be begun, which will in all probability last a lifetime.

An interesting fact brought out in insurance statistics is that of the increased deaths in glycosuria cases from the chronic degenerative diseases of the heart, arteries, and kidneys. This is consistent with common clinical experience. It lends weight to the view that perhaps many cases of diabetes are merely evidence of chronic degenerative change in the pancreas similar to the change in heart, arteries, and kidneys, and that chronic diabetes after middle age probably deserves to be classed with the other chronic degenerative triad, the process merely destroying the Islands of Langerhans in the pancreas as it does the tubules and glomeruli in the kidneys and the muscle cells in the heart.

DISCUSSION ON PAPERS OF DRS. JOSLIN, MULLER AND COOK

Dr. Henry L. Ulrich (Minneapolis): In the discussion on the treatment of diabetes in the light of our experience and present knowledge I think the following categorical remarks are justified.

The acid base equilibria of the body are under the same control in the normal as in the diabetic. The agents employed by the body for the maintenance of these equilibria are the pulmonary ventilation, circulation, kidneys and food ingested. Of these four factors the only one we have under control is the food ingested. The wide tolerance that the normal has to food exposure as compared with the diabetic depends entirely on the capacity of the pancreas. Specifically speaking, it is insulin supply. It behooves us, therefore, to reduce the food exposure of the diabetic. In other words, reduce the food to a relative state of starvation or mild under-nutrition.

By relative starvation I do not mean it in the sense of the old Allen era. I mean it in the sense of our present knowledge of food balances.

I should like to reiterate and emphasize the importance of the fact that coma is a preventable condition, that whenever coma occurs it is always due to some carelessness somewhere, and in the last analysis will probably be found due to the physician in charge. And that coma is always a hospital condition.

Perhaps the better contribution to this discussion would be for me to relate to you some of the work done at the University in the last two or three years in relation to the senile changes which occur in diabetes. I am speaking of hypertension and arteriosclerosis. There has been a shifting of the interest to this side of diabetes because our deaths from coma are reducing, and naturally deaths from senile agency are increasing. This work has not been published, and for that reason I think it might probably be of interest this morning.

Dr. Raymond Peterson reported in 1927 a study of seventy cases of diabetes necropsy material in relation to hypertension and arteriosclerosis.

In his review of the literature it would indicate that there is a tendency to rise of blood pressure in diabetes. In Peterson's group 27.1 per cent of seventy cases had hypertension. Of the forty patients over fifty years of age 42.5 per cent had hypertension. Of 2,486 diabetics, in the literature, plus his seventy cases, 566, or 22.3 per cent, had hypertension, in all age groups. Of 583 cases over fifty years of age, 40 per cent had hypertension. Both these percentages are higher than the necropsy material at the University.

In the age group above fifty years, hypertension is approximately three times higher in diabetics than non-diabetics. We must remember that he is comparing blood pressures and necropsy statistics of hypertension, which is a different thing. A hypertension diagnosis at necropsy depends on the size of the heart and the condition of the kidneys.

His general impression from the literature also is that arteriosclerosis is more marked in the diabetic than non-diabetic, and in his study of the kidney and the pancreas he gives the following facts: Arteriosclerosis is more marked in diabetic than non-diabetic over sixty years of age. The grade of arteriosclerosis in pancreas and kidneys is more marked in diabetics than non-diabetics with advancing years. He also makes the intersting observation that the duration of diabetics has no relation to the degree of sclerosis. He was unable to determine the correlation on that point. In twenty-four of the seventy cases of diabetes the cause of death was some vascular disorder, two of apoplexy, nine of coronary sclerosis, and thirteen had gangrene. He collected 180 cases of gangrene and the percentage of cases given by various authorities ran from 3 to 26.8. Peterson's statistics show 18.5. Gangrene occurred twice as frequently in the male as in the female. The gangrene in non-diabetics in his post-mortem material represent .17 of one per cent. In his statistics gangrene in diabetics is 100 times more frequent than it is in non-diabetics. His conclusion is that arteriosclerosis is more intense and more frequent in the advance-age group of diabetics than in non-diabetics. Hypertension is approximately three times more frequent in diabetics over fifty than non-diabetics in the same age group. Dr. Bell and Dr. Clausson, who sponsored this, think that diabetes hastens sclerosis, and

TABLE I

	14-19 years Men	14-19 years Women	20-29 years Men	20-29 years Women	30-39 years Men	30-39 years Women	40-49 years Men	40-49 years Women	50-59 years Men	50-59 years Women	60-69 years Men	60-69 years Women	70 years and over Men	70 years and over Women
No. Cases	116	231	390		591	668	382	516	312	412	195	196	107	50
No. Elevated B.P.	3	2	10	21	27	67	48	147	82	193	124	77	71	41
Per cent Elevated B.P.	2.58	.857	2.56	3.55	6.279	10.00	12.30	28.48	26.28	46.84	39.53	63.21	66.35	82.00

Total number of cases recorded—4586: men, 1922; women, 2664.

when the kidneys are involved it increases the tendencies toward hypertension.*

While on the subject of hypertension, I am tempted to show you this table (Table I) worked out by Dr. Weatherby[1] in the dispensary. He has tabulated a number of blood pressure readings, in age groups, of 4,586 dispensary patients in the last few years. Using 150 mgm. of mercury as the systolic pressure and 100 diastolic pressure as the dividing line between hypertension and normal pressure, you will find a surprising increase as the age groups go up. There is a steady rise in the various ages. There is a surprising jump between forty and fifty years, particularly in the women's groups. This simply goes to show either that hypertension is more common in the dispensary population or that we have not been realizing that hypertension is much more common in the general population. These findings are practically the same as the percentages in diabetics. You might say that hypertension of diabetes is simply an expression of its morbidity.

In conclusion, one can say there is more tendency to diabetes in the senile group than in younger groups. You might say that hypertension in the diabetics is probably due to arteriosclerosis. We say that arteriosclerosis is hastened in diabetes, or we can say that diabetes may be just an expression of arteriosclerosis. I think the consensus of opinion would be that arteriosclerosis is hastened by diabetes. Is arteriosclerosis an aging process inherent in the germplasm of the individual or is it modified by his environment? The only environment that I can think of that might modify it is food. Therefore, the diabetic is an ideal group in which to study the effect of food as a possible factor in the production of arteriosclerosis.

Dr. Elliott P. Joslin (Boston, Mass.): Gentlemen: May I refer to the remarks of the last speaker first?

Dr. Ulrich struck the keynote. If one studies the arteriosclerosis which is so common in the diabetic, one may get an explanation of the arteriosclerosis which is less common in the non-diabetic. Every atom of information we can get about the diabetic will help us with the non-diabetic. That is reason enough for us to concentrate upon diabetic arteriosclerosis.

Second, the statements about blood pressure are most interesting. They are the most complete that I know of. They are valuable because they show the close relation of the blood pressure to diabetes if properly analyzed. In general, the blood pressure was lower when our patients were on the Allen under-nutrition diet and recently higher when on their larger diets.

Remember this one point about arteriosclerosis. Gangrene is 100 times more common in the diabetic than in the non-diabetic. This fact justifies me in what I wrote a few years ago about the frequency of arteriosclerosis in diabetics. Forty-seven per cent of my

*The discussion on the work on hypertension in diabetes done by S. G. Major at the University (B. A. thesis 1929) is ommitted at his request. I acknowledge his graciousness in letting me use his material for my discussion on the day of the meeting.

1M. Wetherby: Report given before the Minnesota Pathological Society, April, 1929.

patients who have died between 1922 and 1926 have died of arteriosclerosis of one form or another.

A moderate diet in diabetes is emphasized by Dr. Ulrich. That we all agree to. There is no reason to overfeed a diabetic because he is a diabetic.

Coming to the surgical paper, that interested me too. There is just one point of difference that I would make. Professor Muller said that in a severe case of surgical diabetes one should invite the medical man in consultation. I as a medical man do differently. I will discharge nearly every medical diabetic from my ward if you will give me one surgical diabetic. All our surgical diabetics are in the medical wards. I want to give the surgeon the advantage of having our nurses who have seen 1,000 cases of diabetes as compared with the surgical nurses in the surgical ward who may have seen only ten. I will put all our medical facilities at the beck and call of the surgeon, so that the surgical diabetic, who is the serious diabetic, the one who is ten times as liable to die, can have all the advantages of medical treatment. Furthermore, we will give the surgeon a nurse in our medical wards who will do nothing but take care of his surgical patients. We will furnish a technician who will teach them all bed gymnastics. We will add a dental hygienist who will make it easy for the dentist to take out all their bad teeth, and a chiropodist who will look out for their feet. In fact, we will do anything to attract the surgeon and to make our medical wards easy for procedures. Finally we will not interfere with the treatment which the surgeon proposes.

I think it is wonderful what the surgeons have done. They have advanced step by step. They do with diabetic feet and toes today what they can't do with non-diabetic gangrene. Non-diabetic gangrene is progressive. It has reached a stage where the arteries are getting smaller and smaller. Diabetic gangrene comes ten years earlier in life. Diabetic gangrene is precipitated by the diabetes. It is precipitated by the infection. There is more chance of collateral circulation. So the surgeons can take our diabetic toes and cut some of them off, where they wouldn't dare to do it, couldn't do it, with the non-diabetics, because their arteriosclerosis represents the results of old age and is too far advanced.

As far as surgical diabetes is concerned, we doctors have been to blame. We see a patient with a sore toe and it is a terrible temptation because he is a Jew or an old man or an old woman to delay a decision. We don't tell him his toe or his leg must be cut off tomorrow. We let him go ahead for days, for weeks, for months, with a rag around his toe. That is terrible. These people don't live such a great length of time operated upon or not operated upon. Their expectation of life is short. How shall they spend their remaining days? Surely not as invalids. Therefore do not procrastinate, but get them well. Invite the surgeon in early. Secure someone like Dr. Muller, who has had experience with these diabetics, and say, "Do anything you want with that diabetic. We will treat him the best we can from the medical point of view; we want you to give him a life free from doctors and free from suffering. Take the burden from the family."

In regard to the paper on insurance, that also interests me because we need a better understanding with the insurance companies. We do not want insuranee doctors to say that more and more diabetics are dying without qualifying this with the statement that the mortality is at the right end of life. The old and not the young diabetics are dying. As I said earlier today, there are more diabetics in Massachusetts dying over eighty years of age than under thirty. Diabeties are not immortal. They must die some time.

A word or two more in relation to the problem of the diagnosis of diabetes. I think I am in almost complete agreement with the speaker. My ideas on diabetes are not the same today, tomorrow and the next day. "Thought molders. What was good and nourishing food for the spirits of one generation affords no sustenance to the next," and I am willing to change my mind.

As to routine health examinations, of course that means everything for the diabetic problem. That is where to attack it. Examine the urine, and then we can discover the cases early, and remember, it is the women over fifty, the fat women over fifty, the negresses over fifty, the Jewesses over fifty, who are most liable to get diabetes.

The treatment of diabetes is simple. Don't make it complex. Use no fancy ways of treating it; use the simplest possible way you can, but watch the patient. One can examine the urine, temporarily, four times a day. By this means one can frequently avoid blood sugar tests. Good treatment just means taking pains, and if this is done, then the patients do well.

Diabetes incurable? Let's wait. Let's be a little bit cautious. I never dreamed five years ago that patients could do so well as they do now, that a patient with fifteen grams of tolerance for carbohydrate could eventually take 160 grams. Let's be a little bit thoughtful. Remember pernicious anemia.

I want to give you one cheerful thought about diabetes before you go home, and to realize that it is a good disease. Diabetes is a good disease. This is a story about Dr. Kilbourne, a country doctor in Groton. The country doctors are the ones who help us. He sent me a case of a woman in diabetie coma, and Dr. Priscilla White found after bringing her out of coma that she was seven months pregnant. We also learned that she had had five dead babies at term, and a little more investigation disclosed that she had also had seven miscarriages and that now she was pregnant for the thirteenth time. Thanks to her care and her diabetes, which secured for her the help of Dr. Titus, she later underwent a cesarean section, and her thirteenth pregnancy, because she was a diabetic, resulted in her first living child.

DIAGNOSIS AND TREATMENT OF CARCINOMA OF THE ESOPHAGUS*

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THERE is probably not a more distressing or hopeless condition to deal with in medicine than carcinoma of the esophagus. Unfortunately, the esophagus is a relatively common site of carcinoma; only the uterus, breast and stomach are more common sites. It has been variously estimated that carcinoma of the esophagus composes 5 to 12 per cent of all carcinomas. Clayton, in 5,900 necropsies, discovered 812 cases of malignant conditons, of which 5.05 per cent involved the esophagus.

Carcinoma of the esophagus is notoriously a disease of the late decades of life although it occurs at all ages. Males are much more likely to be affected by the malady than females. Else reported that 82 per cent occur in the male, and Vinson placed the ratio at 5:1.

DIAGNOSIS

Carcinoma of the esophagus is very insidious in its onset and the condition usually is well advanced before it produces symptoms. This militates seriously against its successful treatment. The first symptom usually is dysphagia, but this does not develop until the carcinoma has grown large enough partially to obstruct the lumen of the esophagus or to infiltrate the wall of the esophagus to interfere with its normal motility. A large bolus of food always is the instigator of the symptom of dysphagia, and meat most frequently is the substance of which the bolus is composed. Pain and hemorrhage when present usually are late symptoms, although occasionally they are the introductory symptoms. There is a current tendency to criticize the patient for not consulting a physician earlier in the course of the disease, or to criticize the physician for not making the diagnosis more promptly; however, dysphagia practically always is the first symptom and, as mentioned, it develops late in the course of the disease. Therefore the difficulties of diagnosis are manifest.

A good rule to remember is that any patient who is more than forty years and who gives a short history of dysphagia with loss of weight, should be suspected of having carcinoma of the esophagus until proof to the contrary is available.

General examination is of very little value in the diagnosis of carcinoma of the espohagus, but should be done as a routine, and special search should be made for metastatic lymph nodes. The roentgenographic examination is of considerable aid and should be resorted to whenever there exists the least suspicion of trouble in the esophagus; however, it is not infallible. The roentgenographic picture of carcinoma of the esophagus is characterized by an irregular filling defect at the level of the lesion, with evidence of obstruction. Tumors of the esophageal introitus are notoriously difficult to visualize and special care must be exercised to detect them (Fig. 1). Lesions of the cardiac portion (Fig. 2) often offer considerable difficulty in the differential diagnosis in regard to cardiospasm.

One of the most valuable aids in the diagnosis of esophageal disease is the use of the Plummer sound. This instrument is easy to use, and with ordinary care it is practically fool proof, but it should not be passed without the aid of a previously swallowed silk thread as a guide. A number 41 French olive tip is used when the sound is employed for diagnostic purposes and care is used not to exert undue pressure. It is used very much as if it were a palpating finger and the tumor may be felt and small lesions may be detected which have not been discernible roentgenographically (Fig. 3). Further, it makes it possible to determine the distance of the growth from the incisor teeth; this is of value therapeutically. It is well to emphasize that normally there is anatomic narrowing at the introitus, which frequently is mistaken as a pathologic obstruction.

In most instances, a good history of carcinoma, in an elderly person, with positive results from roentgenographic examination and from the passage of sounds, is sufficient for the diagnosis of carcinoma of the esophagus. However, if the least doubt exists as to the etiology of the abnor-

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota State Medical Association, St. Paul, May 13 to 15, 1929.

mality that is found, or if the condition exists in young patients, or in those in whom a microscopic diagnosis is necessary, esophagoscopy is indicated. Esophagoscopy is not recommended for use in all cases as it is not without risk even in the hands of those who are most highly skilled in its use; furthermore, it is not always possible to obtain a satisfactory piece of tissue for diagnosis. The appearance of the tumor, as seen through the esophagoscope, varies considerably but roughly the tumors may be divided into three types: fungated, ulcerated and scirrhous. The fungated variety appears as a cauliflower growth which bleeds easily on manipulation. In the ulcerated type there are elevated, ragged edges, with induration. In the scirrhous type, the lumen of the esophagus is narrowed and irregular, whereas the wall is thickened and stiff and mobility is decreased.

Fig. 1. Carcinoma of the upper end of the esophagus.

PATHOLOGY

It has always been a common teaching that carcinoma of the esophagus is of a low grade of malignancy, and that it seldom metastasizes and then only late in the course of the disease. Recent studies have demonstrated this to be incorrect. Broders and Vinson, applying Broders' gradations for carcinoma in which grade 1 indicates a tumor of low malignancy and grade 4 one of the highest malignancy, found that most carcinomas of the esophagus were of grades 3 and 4; this is substantiated in my study. Metastasis has been found relatively frequently. Helseley found metastasis in 36 per cent and Clayton in 75 per cent of cases at necropsy.

The growth originates in the mucosa and is one of two types: squamous-cell carcinoma or adenocarcinoma. Squamous-cell carcinoma is the more common and may involve any part of the esophagus, although less commonly the lower third. Adenocarcinoma is fairly well limited to the cardiac end of the esophagus. This difference is easily explained on the histologic basis that the mucosal lining of the esophagus is of squamous cells and that of the stomach of columnar cells.

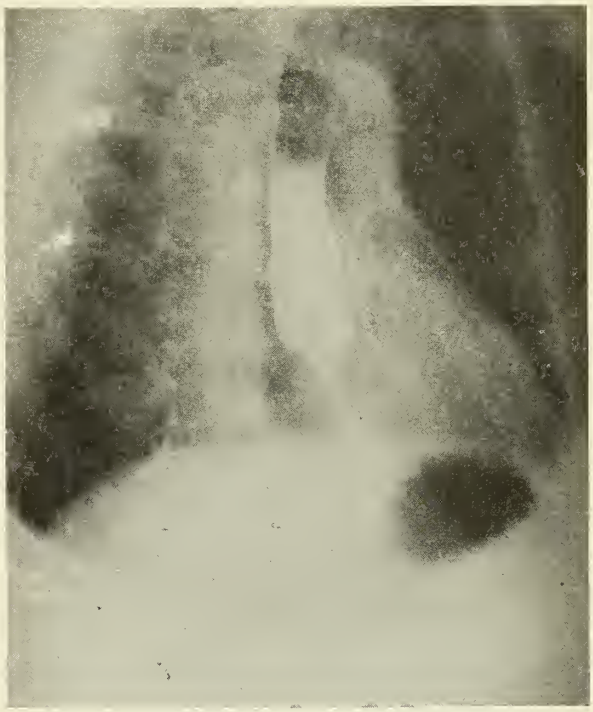

Fig. 2. Carcinoma of the lower end of the esophagus.

TREATMENT

Treatment of carcinoma of the esophagus at the present time is principally palliative rather than curative. The fact that many methods are used and described indicates that no one method has been found satisfactory in all cases.

For many years, surgical operation was the chief hope in dealing with carcinoma of the esophagus. The insidiousness of the onset of the disease, the high degree of malignancy of the tumor, the technical difficulties associated with resection, and the frequency of metastasis, so far

has been an insurmountable obstacle in the path of surgical methods of treatment. Surgical removal of carcinoma of the intrathoracic part of the esophagus has, for all practical purposes, not met with success. Removal of carcinoma from the upper end of the esophagus and from the postcricoid region has been somewhat more encouraging, especially in the hands of British surgeons. Little hope of progress can be looked for from surgical procedures until earlier diagnosis can be made.

Gastrostomy is probably the most common procedure resorted to for carcinoma of the esophagus. Abel has well termed it the procedure of masterly inactivity. The advocates of gastrostomy decry the fact that patients do not submit to the procedure early enough. I wonder how many of such auhors would advise having it done early in the course of the disease on some member of their own family. Much is said of how it helps the esophagus to heal and of its beneficial effect, but it does not markedly prolong life and does not always result in greater comfort for the patient. Besides, it necessitates special care, and frequently, hospitalization. It is not without risk. Muller and Brill reported a mortality of 27.8 per cent in thirty-six cases of gastrostomy whereas the average duration of life of those who survived, excluding two patients who still are living three and four months, respectively, after operation, was six months. Wells, in a series of twenty-six patients who underwent gastrostomy, reported that eighteen died within the first three months, five in the succeeding three months, whereas three others were still living respectively, one, ten and eighteen months after gastrostomy. I do not wish to leave the impression that gastrostomy should be avoided entirely but rather that it should be resorted to only as a final measure. At best, it is only an unhappy means of palliation for a short time.

Intubation by means of Symonds, Souttar or dePezzer's tubes theoretically should be beneficial but practically the results have been discouraging.

The present status of treatment by radium in carcinoma of the esophagus is open to discussion. Hill, Mills and Guisez reported encouraging results from radium, and Guisez reported cures. On the other hand, such an authority as Stone stated that in his experience the results have not been good. At the present time, the greatest hope of successful treatment lies in the development of methods of using radium in the treatment of carcinoma; theoretically it should be beneficial, as the tumors are very cellular and should respond to treatment.

Dilatation of the growth by Plummer sounds is the procedure used in preference to other methods at The Mayo Clinic (Fig. 4). I have reviewed all the cases seen at The Mayo Clinic over a period of four years from January, 1924, to January, 1928, in order to demonstrate what may be expected from this procedure and what the associated risk may be. This is the procedure that requires the least amount of technical skill, hospitalization seldom is required, and the patient is enabled to have the satisfaction of partaking of food in the normal manner.

During the four-year period, 447 patients were treated for carcinoma of the esophagus. All patients were treated by means of dilatation with the Plummer sounds. The sound was guided by a previously swallowed silk thread. There were four deaths from dilatation, all due to the growth splitting from the passage of sounds, which constitutes a mortality of 0.89 per cent. For the purpose of study, I have excluded all cases in which the growth apparently started in the stomach and secondarily involved the esophagus and those in which it originated in the hypopharynx and extended to the esophagus. Likewise, I have excluded those cases in which there might be the least doubt as to the diagnosis and those in which I have not been able to obtain complete information as to the exact date of death of the patient. I have been able to obtain complete information of 228 patients, all of whom have died, and the date of whose death is known.

Two hundred of the patients were males and twenty-eight were females, a ratio of 7.1 :1. The average age of the 228 patients was fifty-eight and sixty-six hundredths years. The youngest patient was aged twenty-eight years and the oldest was aged eighty years. The number of cases according to decades was as follows: third decade, one case; fourth decade, two cases; fifth decade, thirty-nine cases; sixth decade, seventy-eight cases; seventh decade, seventy-eight cases; eighth decade, twenty-seven cases, and ninth decade, three cases.

The average duration of symptoms before the patients presented themselves at the clinic was

7.1 months. The average duration of life following dilatation was six and three-tenths months. This includes the duration of life of the four patients who died from splitting of the esophagus within a week after dilatation. The longest period of life after dilatation was twenty-nine months.

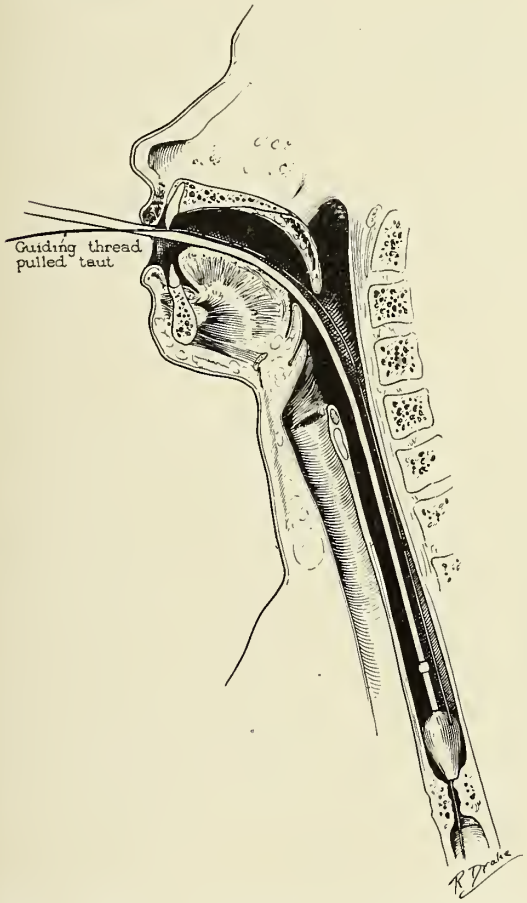

Fig. 3. Method of using Plummer sound for diagnostic purposes.

Tissue for microscopic examination was obtained in eighty-nine of the 228 cases. In sixty-five specimens there was squamous-cell carcinoma, in seventeen adenocarcinoma, and in seven classification was not made. The squamous-cell carcinomas were as follows: three graded 2, twenty-seven graded 3, thirty-four graded 4, and one not graded. The adenocarcinomas were as follows: one graded 1, three graded 2, three graded 3, four graded 4, and six not graded.

The average duration of life for the group in which tissue was obtained was six and four-tenths months. The duration of life was longer in cases of adenocarcinoma than in those of squamous-cell carcinoma.

There seems to be very little relationship between the situation of the growth and longevity. It is rather difficult to say which part of the esophagus is most commonly involved. Most of the lesions seen by the physician who is especially interested in diseases of the throat will be in the upper end of the esophagus, whereas most

Fig. 4. Plummer method of dilating carcinoma of the esophagus.

of those encountered by the gastro-enterologist will involve the lower end of the esophagus. In my series, the lower third of the esophagus was most commonly involved.

A few of the patients received treatment by roentgen rays and radium, in addition to dilatation. The average duration of life in this group was only four and nine-tenths months.

Until a better procedure can be developed it would seem advisable to treat carcinoma of the esophagus by means of dilatation with Plummer

sounds. This probably offers the most comfort with the least amount of risk. The possibility that benefit may be derived from a better understanding of the use of radium should be kept in mind. Resort should be had to gastrostomy only when absolutely necessary.

BIBLIOGRAPHY

1. Abel, A. L.: The treatment of cancer of the esophagus. Brit. Jour. Surg., 1926, xiv, 131-159.
2. Broders, A. C., and Vinson, P. P.: Degree of malignancy of carcinoma of the esophagus. Arch. Otolaryngol., 1928, viii, 79-80.
3. Clayton, E. S.: Carcinoma of the esophagus. Surg., Gynec. and Obst., 1928, xlvi, 52-62.
4. Else, J. E.: Carcinoma of the esophagus. Northwest Med., 1929, xxviii, 25-27.
5. Guisez, Jean. Traitement du cancer de l'oesophage et du larynx par les application locales de radium. Paris méd., 1920, xxxv, 392-397.
6. Helseley: Quoted by Abel.
7. Hill, William: Radium therapy in cancer of the esophagus; the results of fifteen years' experience. Jour. Laryngol. and Otol., 1925, xl, 73-83.
8. Mills, R. W.: Further observations on the radium treatment of cancer of the esophagus with a review of forty-four cases so treated. Am. Jour. Roentgenol., 1923, x, 148-161.
9. Muller, G. P., and Brill, S.: Gastrostomy in carcinoma of esophagus. Ann. Surg., 1928, lxxxviii, 48-57.
10. Stone, W. S.: Radium therapy in carcinoma of the esophagus. Arch. Surg., 1926, xii, 230-231.
11. Vinson, P. P.: Carcinoma of the esophagus. Am. Jour. Med. Sc., 1923, clxvi, 402-414.
12. Wells, J. R.: Gastrostomy for cancer of the esophagus. Surg. Clin. N. Amer., 1927, ii, 381-397.

SODIPHENE NOT ACCEPTABLE FOR N. N. R.

The Council on Pharmacy and Chemistry reports that Sodiphene (Sodiphene Company, Kansas City, Mo.) is stated to have the following composition: "Phenol, 4 per cent; Sodium Hydroxide, 1 per cent; Cassia Oil, 0.01 per cent; Witch Hazel, 0.10 per cent; Boric Acid, 0.08 per cent; alcohol, 0.2 per cent; Wintergreen Oil, trace." The Council finds that there is no evidence to indicate that, in the amounts present, the cassia oil, witch hazel, boric acid and alcohol have any therapeutic effect and the cassia oil evidently acts as a flavor, only. The preparation must therefore be considered an alkaline phenol solution containing sodium phenolate rendered unscientific and needlessly complex by the addition of witch hazel and boric acid. Alkaline phenol solutions were in extensive use many years ago but have been generally abandoned. The preparation therefore is not only unscientific but it also lacks novelty, and extensive use of similar preparations has failed to demonstrate the usefulness of alkaline phenol preparations. The Council declared Sodiphene unacceptable for New and Non-official Remedies because it is an unscientific, needlessly complex mixture, marketed under a nondescriptive name, which presents no originality entitling it to a proprietary name and which is marketed without a statement of composition on the label and for which unwarranted claims are made. (Jour. A. M. A., August 3, 1929, p. 381.)

USE OF COMBINATION OF BARBITAL AND AMIDOPYRINE

There seems to be no reason to doubt that a mixture composed of one of the analgesic drugs, such as amidopyrine, acetylsalicylic acid, acetanilid or acetphenetidin, and a hypnotic drug of the barbital type is more effective in relieving pain than is either of the components alone. This type of mixture was popularized apparently, if not originated, by von Noorden, who reported that a mixture containing 0.3 Gm. of barbital, 0.25 Gm. of acetphenetidin and from 0.0025 to 0.03 Gm. of codeine was equal in effect to 0.6 Gm. of barbital without the side action of the latter, but he did not present satisfactory evidence in support of that statement. At present there is a large number of proprietary remedies of this general type on the market. There has been apparently no satisfactory clinical comparison of the pain-relieving power of any of these preparations with that of the simple analgesics. A mixture of barbital and amidopyrine is probably as useful as any of the expensive proprietary preparations of this type. The action of the hypnotic may outlast that of the analgesic; hence they may be used separately, the analgesic being repeated more frequently than the hypnotic. (Jour. A. M. A., August 31, 1929, p. 713.)

DIAGNOSIS AND RESULTS IN CARCINOMA OF THE STOMACH*

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A REVIEW of all the cases of carcinoma of the stomach, recorded at St. Luke's hospital, Duluth, from Jan. 1, 1924, to August, 1928. The types of cases are classified according to the treatment given, in the following chart:

CHART 1

Cases	Number	Per cent
Non-operative	18	40
Operative	27	60
Exploratory	12	44.4
Palliative	7	25.9
Resection	8	29.7
Total	45	100

Early diagnosis has been emphasized in almost every review of this subject and this one is no exception. The outstanding fact here demonstrated is that only eight of the forty-five cases (18 per cent) were diagnosed early enough to warrant attempts at curative surgical treatment. It is generally conceded at the present time that the cases suitable for radical operation should average from 20 to 33 per cent (Sherren[8]). This study was made to determine those factors bearing on diagnosis. The results of treatment were recorded to show that radical surgical treatment in the proper cases offers the only hope of cure.

Of general interest is the fact that there were twenty-nine males and sixteen females (64.4 and 35.6 per cent respectively) in the series. The age limits represented were from 37 to 75 years, the average age being 58.2 years. Warwick,[9] in an analysis of 176 autopsies of carcinoma of the stomach, found that the disease occurred more frequently in men than in women (males 81 per cent, females 19 per cent); also that the age varied from 32 to 82 with an average of 59 years. The largest number occurred in the sixth and fifth decades, but cases have been reported in young adults and the extremely aged.

The diversity of symptoms noted in this study will be found to be variable. One is led to the inevitable conclusion that there are no symptoms pathognomonic of carcinoma in any stage. The following chart demonstrates the difficulty in diagnosis from symptoms alone.

CHART 2

Symptom Groups	Cases	Per cent
Resembling chronic cholecystitis	5	11.1
Resembling pernicious anemia	3	6.7
Obstructive symptoms—Pylorus	10	22.2
Obstructive symptoms—Cardia	1	2.2
Carcinoma or variable	5	11.1
Hemorrhage	6	13.4

You will note the variety of clinical types represented in this series. There is a high percentage of cases presenting the usual complaints noted in simple ulcer. Differentiation is more probable if the classical symptoms of duodenal or gastric ulcer appear in a man of middle age for the first time, but do not improve under treatment, no interval occurring. Let me explain that these are cases of carcinoma of the stomach, with present symptoms simulating ulcer. They are not cases presenting a previous history of ulcer, although it is generally recognized that a certain percentage of cases, probably 10 to 20 per cent (Scott[7]) of all cases diagnosed as chronic gastric ulcer, are cancerous. Many investigators, including McCarty, Von Eiselsberg, Moynihan and Horsley, present pathological evidence supporting the etiological relationship of ulcer to cancer, while Ewing[2] doubts it. Previous ulcer history is only considered here, because of its possible suggestive value in diagnosis.

The second group comprises all those symptoms which come under the heading of "dyspepsia" or chronic gallbladder disease and are usually not associated with vomiting or marked pain. However, the general health fails steadily and severe symptoms are subdued until a later stage. Pernicious anemia may be dismissed at this time with the statement that any case of anemia which does not respond to the Minot-Murphy diet is of a secondary type, and may be due to carci-

*Presented before the regular staff meeting of St. Luke's Hospital, Duluth, Minn., Apr. 2, 1929.

noma. Obstructive symptoms at the pyloris were present in eleven cases, only one being noted at the cardia. Hemorrhage was a prominent symptom in six cases and anemia developed very rapidly. Five cases could not be classified.

In the above résumé of the symptom groups it is interesting to note that the onset was of less than a year in 60 per cent: more than a year in 40 per cent of the cases. These figures agree with those of R. Straus of Rostock, who noted, in a review of gastric cancer, that in more than half, the history showed a normal previously healthy stomach, the first symptoms dating back six months at the most.

The gastric analyses will be briefly reviewed to show that while it is not an absolute method of inquiry it is today one of the corroborative methods of diagnosis.

CHART 3

Gastric Analysis	Test Omitted	Cases Tested	Positive	Negative	Limits in Positive Reaction
Total Acids	31	14	14		5°–176°
Free HCl	28	17	2	15	38°–50.5°
Comb. HCl	44	1	1		28°
Occult Blood	29	16	14	2	Ft. trace to +++
Boas-Oppler Bacilli	43	2	2		
Lactic acid	37	8	6	2	+ to ++++

You will observe that in most cases the test was omitted, but that in those instances where it was made it gave evidence of the probable presence of a cancerous lesion. This is shown by the absence of free hydrochloric acid and the presence of occult blood, Boas-Oppler bacilli, and lactic acid. Stool analysis was not done in thirty-seven cases. Of eight examinations occult blood was found in five cases. The results, then, of gastric and stool analysis may be variable but in this series it would seem that they are of diagnostic value.

Up to this time all evidence presented in diagnosis has been only suggestive. The most conclusive evidence in diagnosis is to be found in radiological examination. According to Moynihan[6] and Wyard[11] of England it is the most valuable.

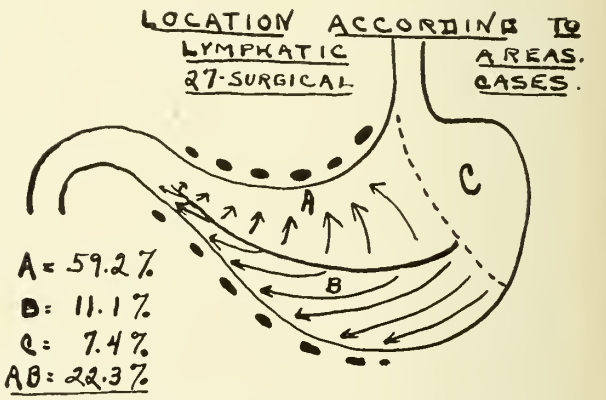
From Chart IV one can quickly see that there is a rather high percentage of accuracy in those cases where *x*-ray was utilized. There is

CHART 4

X-ray Diagnosis	
None or no record	16
Positive	17
Questionable Ca.	6
Probable ca. or ulcer	3
Ca. or Gumma	1
Not diagnosed	2
Total	45

no other method by which such a high degree of accuracy can be obtained. It is an aid to the surgeon in defining the extent of involvement as well as in detecting the disease.

CHART 5



Location of the lesions in this series, the stomach being divided into three areas.

There are two types of carcinoma (S. Wyard[11]) presenting distinctive *x*-ray findings: (1) that which proliferates internally and forms a mass projecting into the lumen of the organ, infiltration of the wall and extension to surrounding and distant tissues being relatively slow; (2) that which infiltrates the gastric wall, encroaching but very little upon the cavity. The former should rapidly produce some alteration in outline recognizable in radiographic films. On the other hand, it is clear that the latter may possibly exist for a considerable time before causing any such change. It has been stated by Monninger of the University of Budapest that most carcinomas of the greater curvature were extensions from the lesser.

The basic roentgenological sign of cancer is the filling defect. This is constant in situation and is usually irregular in outline and sharply delineated. It persists unchanged after manipulation or after the giving of antispasmodics. It is in an area without peristalsis, and if it is large enough and in a region accessible to palpation a

corresponding mass can be felt. If any of these characteristics are lacking the diagnosis of cancer is highly questionable.[5]

The smaller lesions may now be detected by serial plates inasmuch as each peristaltic wave occupies approximately twenty seconds in passing from cardia to pylorus, so that at least once in every twenty seconds each zone of the stomach wall contracts and alters its position relative to the rest of the organ. A cancerous lesion present will prevent normal contraction of the zone in which it lies, and the following excursion during the peristaltic cycle is limited. Therefore if ten plates were taken at intervals of two seconds this fixed lesion would be demonstrable. The problem then would not be the diagnosis of cancer but its differentiation from simple ulcer.

Since one-third of all deaths from cancer are due to cancer of the stomach (Horsley[3]) the results of treatment are apparent without further study. However, I will record them in 40 follow-up cases as follows:

CHART 6

Result	Non-operative	Exploratory O.R.	Palliative O.R.	Resection O.R.	Total
Died	14	12	6	4	36
Alive and unimproved	0	0	0	1	1
Alive and improved	0	0	0	3	3
Died in ave. mos.	3¾	4½	4¼	8	5¼
Alive ave. mos.	0	0	0	13¼	13¼
Operative deaths	0	6	4	2	12

You will note that thirty-six of the forty cases cases entering died on an average of five months and one week from the date of entrance. Also of the eight cases operated upon, four died; of the four living, three are well on an average of thirteen months and one week after operation, while one is unimproved but nevertheless alive. It further illustrates that the mortality is just as high or higher from exploratory and palliative operations as from resection. Palliative operations are only of value in obstruction and their field of usefulness is lessened by the high mortality connected with them. Diagnostic exploratory should only be done when all other methods are doubtful as to the presence of a growth or as to the nature of the organic change undoubtedly observed.

W. J. Mayo sums up the present outlook as follows: A patient with a cancer of the stomach which is sufficiently localized to be removed radically has a better than 90 per cent chance to recover from the operation, better than a 36 per cent chance of a three-year cure, and at least a 25 per cent chance of a five-year cure. However, results depend upon the choice of patients and the skill of the surgeon.

In our mortality group the average duration of symptoms prior to entrance was ten months, the limits being two weeks to four years. After entering the hospital the average length of life was five months, therefore the natural course of the disease is about 15 months. It is generally stated that life is rarely prolonged more than twelve months from the appearance of symptoms unless an operation is performed.

Summary: The above review indicates:

1. Early diagnosis and radical surgery are necessary, to improve the results in treatment of carcinoma of the stomach.

2. There are no positive symptoms of this disease, but certain symptom groups demand further careful investigation.

3. All forms of clinical and laboratory study should be made so that added suggestive signs may be detected.

4. Radiology offers the best means for accurate diagnosis and should be more freely utilized.

BIBLIOGRAPHY

1. Bickman, Warren Stone: Operative treatment of cancer of stomach in general. Oper. Surg., 4: 354-388, 1924.
2. Ewing, J.: The relation of gastric ulcer to cancer. Ann. of Surg., 67: 715-724, 1918.
3. Horsley, Shelton J., M.D.: Relationship between peptic ulcer and gastric cancer. Dig. 5: 195-198, April, 1928.
4. Lampson, E. R.: Carcinoma of stomach. Boston Med. and Surg. Jour., 196: 468-472, March 24, 1927.
5. Moore, Alexander B.: Lesions roentgenologically simulating gastric cancer. Amer. Jour. of Surg., 2: 234-238, March, 1927.
6. Moynihan, Sir Berkeley: Cancer of the stomach. The Practitioner. 121: 137-148, September, 1928.
7. Scott, W. J. M.: Relationship of carcinoma and chronic gastric ulcer. Surg. Gynec. & Obstet., 46: 199-212, February, 1928.
8. Sherren, James: Carcinoma of stomach. Index of Prognosis. Page 519, 1926.
9. Warwick, M.: Analysis of 176 cases of carcinoma of stomach submitted to autopsy. Ann. of Surg., 88: 216-226, August, 1928.
10. Wheeler, W. I.: Cancer of stomach. Irish Jour. of Med. Sci., 6th Series. Pages 268-272, June, 1927.
11. Wyard, S.: The early diagnosis of cancer of the stomach. The Cancer Review, 3: 1-9, January, 1928.

UNDULANT FEVER*

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UNDULANT fever (more commonly known as "Malta fever") is a disease of antiquity, and was probably described by Hippocrates, who wrote of the occurrence of a fever with short apyrexial periods and lasting one hundred and twenty days, which may have been what was later known as Malta fever.

The term "undulant fever," as suggested by Hughes in 1892, is a more suitable name, since the disease is not restricted to the proximity of Malta and the Mediterranean, but has been found widespread in the Temperate Zone as well as in the original Sub-tropical. The term "Malta fever" is also so closely linked with the disease as derived from infected goats that the term "undulant fever" (descriptive of the wavelike character of the temperature curve) is more acceptable, because it includes the more recently discovered type of undulant fever derived from abortion fever in cattle, which, though less severe, is nevertheless in close identity with the original Malta fever, except for certain serologic characteristics in the invading organism.

The dissemination of undulant fever in the United States, in Italy and in Rhodesia, as well as isolated reports from elsewhere, makes a consideration of the disease, its symptoms and its epidemiology, important. The widespread use of raw milk from infected cattle makes it conceivable that the disease will probably reach endemic and at times epidemic proportions in this country. Nicolle, the Noble Prize winner in 1928, in speaking of Malta fever of caprine origin, believes that it is the infective disease of the future.

Undulant fever is a specific infectious disease, due to an organism of the brucella group, as designated at present, and is characterized by a fever of long but varying duration, an irregular course, with a tendency to relapses and remissions, and varying concomitant symptoms, notably profuse perspiration, arthralgic pains, and frequently enlargement of the spleen.

The caprine variety in Malta was first described as a specific entity by Marston in 1859, and in 1886 Bruce[2] isolated the organism from the spleen, since named "Brucella melitensis."

Bang,[1] in 1897, discovered the variant abortus form of the Brucella melitensis as the cause of infectious cattle abortion. In the same year, Wright and Semple showed that the diagnosis of undulant fever could be made with the agglutination test, and in 1904 the British Government showed the relationship between the infection in man and infected goats, so that suitable preventive measures could be instituted, with the most striking effects in the local epidemiology of the disease in the British zone of control in Malta and Gibralter. Much of our knowledge of Malta fever is due to the research work of the British Commission, and particularly to Bassett-Smith, one of the leading investigators.

BACTERIOLOGY

Since the work of Alice Evans[9] in 1917, and the proposal of the generic term "brucella" by Meyer and Shaw in 1920, the latter name has met with general approval, and has been used by foreign investigators.

The organism consists of small rods, and seven strains have been discovered by Alice Evans which have closer cultural, morphologic and serologic characteristics than various strains of pneumo- or meningococci. The Bacillus tularense and the Bacillus bronchisepticus (cause of distemper in dogs) are evidently closely related, and cross agglutination occurs at least with the former.

The only certain way in which the specific identity of the type of organism can be ascertained is by means of the agglutinin absorption test, based on the fact that if Organism "A" absorbs all agglutinins in the same titer in a serum as Organism "B," they are identical, and if not, the organism causing an agglutination in the higher dilution is identified as the agent causing the disease.

The technique for the cultivation of Brucella melitensis and the technique of the absorption agglutination test were described in an article by

*Presented before the annual meeting of the Minnesota State Medical Association, St. Paul, May 14, 1929.

Alice Evans in "Laboratory Procedures in the Diagnosis of Undulant Fever," appearing in the Journal of the American Public Health Association, Volume 17, 1927, pages 399-403, to which the reader is referred for essential detail.

EPIDEMIOLOGY

It has been observed in Italy that the disease locally known as Malta fever affects people between the ages of forty and fifty particularly, and that children under six and adults over fifty are relatively immune to the infection. This is also true of undulant fever of the abortus type as observed in this country, most of the patients afflicted being people in early middle life, evidently much more rarely in infancy and early youth.

In a personal communication, Dr. Hardy[16] states that the youngest patient he has seen was twenty-two months of age, and Alice Evans,[11] in her experience with sixty-five tabulated cases, found the youngest to have been four years of age. In a patient recently under the observation of Dr. C. O. Kohlbry of the Duluth Clinic, an authenticated case was found in an infant only fifteen months of age.

The relative immunity of children may be due to a natural immunity which persists for some time after birth, or may be due to repeated subclinical infections not sufficient to cause the development of clinical symptoms. It is possible too that the blood in children harbors too few agglutinins to yield a positive reaction.

The usual predisposing factors operate as in the incidence of other infectious diseases. A rundown condition, ill health, or acute infections, seem to predispose.

In the caprine type the infection is evidently derived from contact with the excreta of infected goats or from an infected milk supply; through milking and feeding the animals, or by laboratory workers.

In an investigation on the island of Malta it was found that fifty per cent of the goats were infected, and the prompt institution of preventive measures by the British government in Gibraltar and Malta caused virtually a complete disappearance of the disease.

It has likewise been proved that sheep, horses, chickens, ducks, rabbits and monkeys are susceptible to the infection.

In investigating the abortus type it was observed that in sixty per cent of the infected cows the organism has been isolated from the milk, and at Cornell University it was observed that thirty per cent of the herds were infected. The disease is very common in cattle, and eighty-five per cent of abortion in cattle is due to the Brucella melitens of the abortus type.

It is possible that the disease in the human tends to step up the virulence of the organism, as inoculated heifers aborted in twenty days instead of the usual average of forty-two days in the infected controls. The incubation period of both the caprine and bovine types is probably six to fourteen days, but since the patients frequently feel quite well, particularly with the abortus type, in spite of the increase in the temperature; and because of lack of familiarity with the disease, the condition is frequently not recognized for a long time after its development. Undoubtedly, likewise, many patients having mild evidences of the disease render recognition difficult.

In 1903 Craig[7] first described the disease of the caprine strain as occurring in the United States. It was found more extensively by Gentry and Ferenbaugh[15] among the goat herders on the Mexican border in 1911, where the disease was said to have existed for twenty-five years, and was known as "slow fever, Rio Grande fever and mountain fever." An epidemic from caprine sources was likewise described in Phoenix, Arizona, in 1922. Goats were brought to Phoenix from the ranges and pastured near one of the principal dairies, with the result that in a short time twenty cases were discovered before the sale of goats' milk was stopped. The Public Health Service found seventeen additional cases later. Previous to that time Yount and Looney[22] had reported five cases occurring in Arizona in 1912.

Although it is now known that undulant fever from infected cattle and hogs is the same infection, though due to a variant organism, it was not until 1918 that Alice Evans established the relationship between so-called "abortion fever" and "Malta fever" as evidenced in the human.

In Rhodesia and in Italy, it was similarly observed that the possibility of transmission of abortion fever from cattle to the human was likely.

Keefer[18] reported the first case of infection with the abortus type in the human in this coun-

try in 1924. Soon thereafter others were reported by Evans,[10] Duncan,[8] Huddleson[17] and Carpenter.[6] It is of interest that, in 1913, Larson and Sedgwick,[19] from this state, stated that many persons harbored agglutinins for abortion fever cases occurring in Minnesota since the disease was first reported in this state in the spring of 1927.

In 1927, six cases were observed, and in 1928, thirteen more—a total of nineteen. Up to the

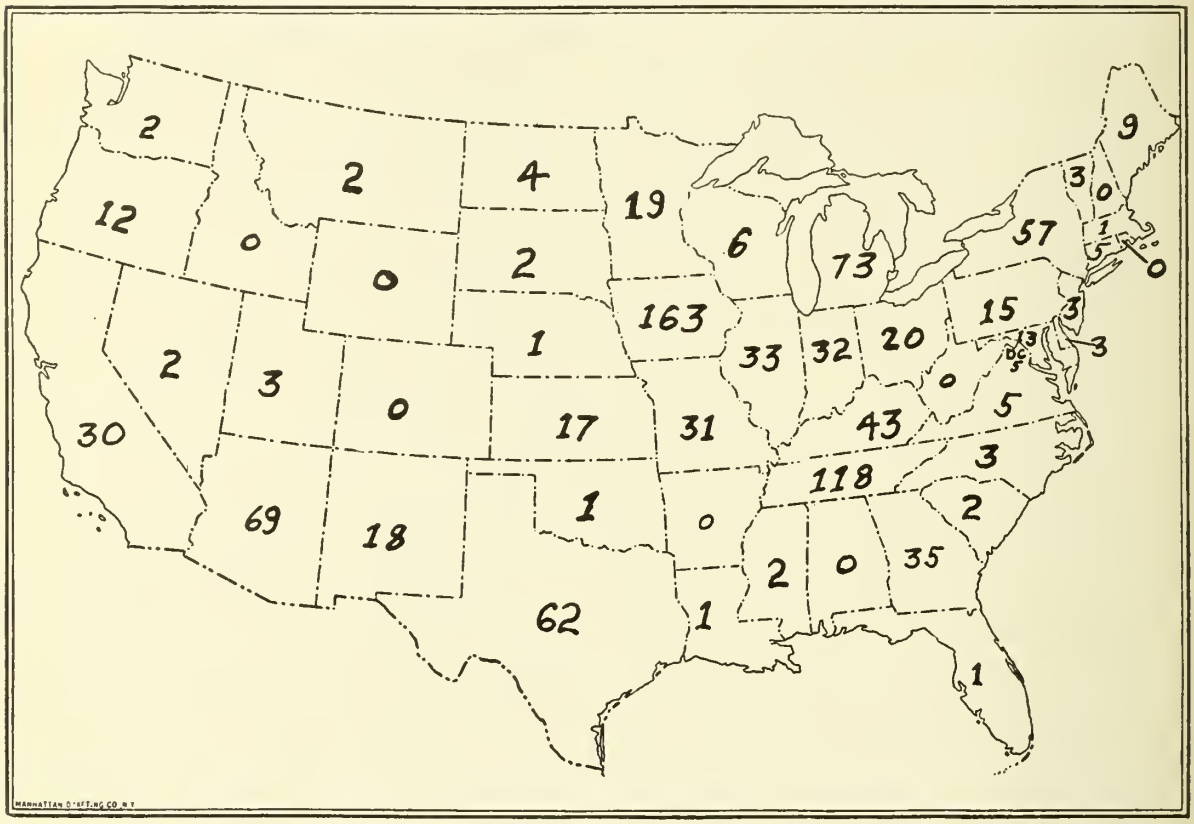

Fig. 1. Reported cases of undulant fever up to Jan. 1, 1929, Statistics by courtesy of Dr. A. V. Hardy, Iowa City, Iowa.

in the blood, and pointed out that cattle were the most common source, as there was very little contact with hogs or horses. They found that with the complement fixation test in the serum of women who had aborted, a larger number gave a positive reaction with the contagious abortion organism than with the usual Wassermann test, and in 425 children tested for antibodies to the Brucella melitens, abortus type, they found positive reactions present in seventeen per cent. In a group of children where the milk was from a known source, with no infection, all reactions were negative.

UNDULANT FEVER IN MINNESOTA

Through the kindness of Dr. McDaniel of the Minnesota Department of Health, I have been able to procure some of the data relative to the present time, in 1929, a letter from Dr. McDaniel of April 1 states that seven additional cases have been found, and since then two further cases have been uncovered in Duluth.

The disease is either gaining in prevalence or is being more frequently recognized. I believe that both are factors.

Of the nineteen tabulated cases in this state in 1927 and 1928, the age incidence varied from fifteen to fifty, most of the cases occurring between twenty-five and forty-five. Fifteen were males and four were females. The data are inadequate on five, but of the remaining fourteen cases, thirteen used raw milk and one, only, pasteurized milk, but gave a history of having eaten Roquefort cheese about two weeks prior to the onset. This was the patient I first observed, and showed an agglutination test against the Brucella melitens, type melitens, with a much higher di-

lution than against the abortus type, indicating the possibility of a caprine infection.

Of the herds supplying the thirteen persons who used raw milk, a history of abortion among the cattle, within three years, was obtained in seven herds, and of these seven herds, three showed positive agglutination reactions. Interestingly, in one large herd of 120 cows, in which there was no history of abortion, examination revealed twenty-four animals showing reactions, the explanation being that the absence of a history of abortion was due to the fact that the owner did not breed.

In one patient there was a question of an infection in the stockyards, although he also drank raw milk, and gave a history of eating at various restaurants, frequently indulging in pork which was undercooked.

Of the nineteen cases, twelve might be considered as occurring in the rural communities, and seven in the urban centers, but in several of the patients who resided in the city it was apparent that the infection was contracted in the country, particularly in one of the Duluth cases, where the infection was no doubt derived from drinking raw milk at the time of a hunting trip, and where there was a history of an obscure and long continued fever a short time previous in the owner of the hunting lodge.

Aside from the one suspicious case of caprine origin, there is no reason to believe that the caprine strain has ever been a cause of the disease in this state. Since neither of the organisms has ever been isolated from blood culture from the patients, this point may be questioned. It is reasonable to suppose that the abortus strain is the organism causing the disease in this state, and a personal letter from Dr. C. P. Fitch,[13] chief of the Division of Veterinary Medicine, University of Minnesota, states that abortion fever is very common in cattle in this state, as indicated by the accompanying table (Table 1).

What is known as poll evil and fistula in horses is undoubtedly caused by the Bang organism likewise, as was first mentioned at a meeting of the Academy of Veterinary Sciences in France in July, 1928.

A disease with so many possible sources of infection, and the widespread use of unpasteurized milk, as well as the increasing incidence of the infection in the human in this state, make a consideration of the disease very timely.

SYMPTOMS AND CLINICAL COURSE

Several of the symptoms of undulant fever are of outstanding significance and interest, but many are only the usual subjective evidences associated with any febrile state.

The duration of the disease varies considerably —from three weeks to several years—one infected laboratory worker having evidences of the disease for five years. It is quite evident that the two types of undulant fever vary considerably in their severity and duration, but not so much in their individual clinical manifestations. The caprine, or melitensis type, up to the present time, at least, has shown evidence of greater

TABLE I

	Positive	Negative	Suspicious	Total
1922–23	231	253	70	554
1923–24	569	851	88	1508
1924–25	574	1175	115	1864
1925–26	771	1470	115	2356
1926–27	1049	2213	140	3402
1927–28	1744	4493	398	6635

Positive—those samples showing agglutination at 1 to 100 dilution or above.

Negative—those samples showing no agglutination.

Suspicious—those samples showing agglutination below 1 to 100 dilution.

Tests for abortion fever in cattle made by Dr. Fenstermacher, University Farm, Saint Paul, Minnesota.

virulence and a tendency to a longer duration of illness.

The fever, particularly in the true melitense type, is characterized by undulations or wavelike pyrexial periods, with apyrexial remissions. During the febrile period the temperature curve is usually of the remittent, occasionally of the intermittent type. In the abortus type this characteristic fever curve is not so common, and many have a continuous, intermittent or remittent temperature, with or without a suggestion of short periods of complete remission. In the milder infections a continuous elevation of the temperature is not uncommon. The temperature frequently does not become elevated over 100 or 101 degrees, but in other instances may rise to 104 to 106.

Profuse sweating at night is a symptom more commonly complained of than any other, unless it be the general feeling of weakness incident to any continued febrile state. The sweating is at times so profuse as to virtually run off the pa-

tient, soaking the nightclothes and bed linen sufficiently to require several changes.

Other subjective symptoms are not characterized by any unusual features, and are merely the usual concomitants of a severe infection, and include weakness, general aching, headache, backache, anorexia, nausea, vomiting, constipation, occasional looseness of the bowels, cough, sore throat, sleeplessness, etc. In spite of the drenching sweats, chills are not an outstanding complaint, although a feeling of chilliness is not uncommon. In the later stages of the disease, arthralgic pains are frequently complained of, and may be considered a clue in the diagnosis. As a rule these pains are not accompanied by any manifest arthritic changes. The pulse is elevated in varying proportion to the temperature curve, but has a tendency to be higher in the. later stages of the disease rather than in the early phases, evidently because of circulatory exhaustion. The respiratory rate is slightly increased.

The physical examination, particularly in the abortus type (with which we are better acquainted in this vicinity), usually reveals far less exhaustion and lassitude than one would expect with high fever. Patients frequently present themselves at the office with a temperature of 103 or 104, and exhibit a normal mental alertness and a good physical appearance. Many patients continue their usual employment for a period of time, suggesting what is commonly known as "walking typhoid." Aside from an enlargement of the spleen, which is present in about twenty per cent of the cases, and an enlargement of the liver, present in about ten per cent, the physical findings are singularly negative, much as in typhoid fever. Orchitis occurs in about four per cent of the melitense type of infection. As a result of the long standing illness, neuritic phenomena, pains in the extremities, wasting and atrophy, are not an uncommon sequel. Rales may be present in both bases. Bronchopneumonia rarely occurs.

The outstanding clinical manifestations, therefore, are the long duration of illness, the more or less characteristic temperature curve, extreme sweating, the arthralgic pains, enlargement of the spleen or liver, and the rather paradoxical good physical appearance of the patient, and his normal orientation.

Aside from the agglutination test there are no pathognomonic laboratory findings. The urine often shows the usual febrile albuminuria. In many instances the differential blood count shows a monocytosis. The white blood count is usually normal, or a leukopenia is observed. In the later phase of the disease a secondary anemia is not uncommon, of the toxic type.

DIAGNOSIS

The absence of any pathognomonic clinical symptoms renders a differentiation from other acute diseases frequently difficult. The diseases most likely confused with undulant fever are typhoid fever, malaria, acute rheumatic conditions, subacute bacterial endocarditis, miliary tuberculosis, and subacute and chronic infections of various types. Recently a patient under our observation presented some confusion with Hodgkin's disease because of a moderate adenopathy and a fever curve suggesting the Pel-Ebstein type. In making the diagnosis, however, the following points must be kept in mind:

1. The long standing and variable fever, with a tendency to undulations.
2. Profuse sweating.
3. The arthralgic pains.
4. Enlargement of the spleen.
5. The alert mental condition and good general appearance of the patient.
6. A normal or reduced white blood cell count, with a tendency to moncytosis.
7. The agglutination test.
8. The blood culture.

Because of the importance of the agglutination test and its rather unusual features, some points should be emphasized.

Much credit is due Alice Evans for her work in the identification of the various strains of the Brucella melitensis and the elaboration of the absorptive agglutination test.

Most observers are agreed that a test to be positively indicative of the activity of the disease must show an agglutination in a dilution of 1:80 or higher. It is probable that five per cent of the general population will show a positive agglutination response in a more or less concentrated dilution. Shaw found that among 525 Maltese stevedores fifteen per cent showed a positive reaction, and Alice Evans, in testing 500 sera taken at random, showed a positive agglutination response in 11.4 per cent. These patients of course, did not all show clinical symptoms, and the significance of the positive test is not exactly

known, unless it means merely a previous infection, clinical or subclinical in type.

There is a question at the present time as to the significance of a negative agglutination test in the face of suggestive clinical symptoms. It is entirely likely that fifteen to twenty per cent of patients with active clinical symptoms yield a negative test, and the diagnosis then must be made on a blood culture.

In a recent epidemic at Purdue University, six negative agglutination tests were recorded in 26 cases by Farbar and Mathews.[12]

Another important feature in the agglutination test is the tendency to cross-agglutination with the Brucella tularense. It is therefore wise to test all sera which are sent in on a presumptive diagnosis of tularemia also for the Brucella melitense, because it will be found that not infrequently an agglutination with a much higher dilution will be present against the various types of the Brucella melitense, indicating that infection rather than tularemia. This is probably true particularly in the typhoid type of the latter disease, and rechecking in several instances by the Hygienic Laboratories has proved that cases previously diagnosed as tularemia where found actually to be undulant fever.

In the state of Minnesota a test for the Brucella melitense, type militense, is not made because of the grave danger of laboratory infection. As already stated one laboratory worker at the present time has an infection existent for five years. The danger at present is too great to permit anything except the test for the abortus strains. It would be well for the laboratory to be equipped at least to make the latter test, so that all patients exhibiting symptoms in any way suggestive of undulant fever could have a test made. This is particularly true of suspected typhoid fever.

PROGNOSIS

Undulant fever as occurring in the Mediterranean has a mortality rate of about two per cent. Statistics in this country are not yet available as to the mortality rate from the abortus type.

The patients who die from the disease are apparently those with extreme hyperpyrexia and ultimate heart weakness and exhaustion.

It is generally believed that a high agglutination titer is of good prognostic significance, as is thought to be true also in patients who show an increase in the agglutination titer. On the contrary, a rapid reduction in the number of agglutinins is an unfavorable prognosis, as is the maintenance of a low agglutination capacity in the face of severe symptoms. However, many patients who have a negative agglutination reaction are afflicted with evidences of the disease.

TREATMENT AND PROPHYLAXIS

The treatment of undulant fever is symptomatic. Some investigators have reported favorable results with the intravenous use of certain anilin dyes, but in the hands of others this has been unsuccessful. The treatment with vaccines and sera has proved unsuccessful.

The essential feature in cutting down the period of invalidism and a delayed convalescence seems to be an insistence on rest in bed, with treatment of the individual symptoms as they arise.

The question of paramount importance presently is the prevention of the disease. Infection from infected goats in one way or another at the present time in northern United States is a problem of little importance. On the Mexican border the situation is different, since the caprine infection is quite prevalent. In the northern part of the United States and in Minnesota, the avoidance of infection from infected cattle or infected milk supplied from cows is of great importance.

Through the kindness of Dr. A. W. Hardy, acting head of the State Hygienic Laboratories at Iowa City, I have a report from the committee on Contagious Abortion of the National Research Council, which gives an index as to the activities of various agencies in this country, leading to a better understanding of the disease. In New York a state association of public health laboratories is making a survey to ascertain the occurrence of the infection in the state, and all bloods sent in for agglutination tests are tested for undulant fever. In Tennessee agglutinin absorption tests are being performed, and Illinois and Iowa have appointed committees to cooperate in the study of the infection. Sixteen states at the present time are making tests for undulant fever routinely on all blood sent in for agglutination. In fourteen states tests are made only on request, and in seven no tests for undulant fever are being made.

From the standpoint of veterinary science, ef-

forts at prevention and control of the disease occurring in cattle and hogs are important, but the practicability of eliminating the disease in domestic animals in this state is going to prove extremely laborious, and probably will not be productive of any tangible results for a long time to come. The transportation of blooded stock from distant points in this country has proved to be a factor in the propagation and dissemination of the disease. Formerly, when the herds were more or less isolated, the disease was not so widespread. If the farmer can eliminate the disease from his herd the problem will not be so difficult in the future if all purchased animals are tested before adding them to the herd. If only a few animals in the herd are found infected they should be removed. Since the offspring is not necessarily infected it is possible to build up a clean herd through the offspring of infected ones. Every specific herd must be treated individually, rendering the problem a difficult one. It requires the closest co-operation of the state livestock sanitary board.

Prophylaxis in the human, therefore, at least for the immediate future, will have to depend on a wholesome sanitary milk supply from a herd known to be free from the disease, or through pasteurization. Since pasteurization laws have been difficult to pass in the face of previous milk born epidemics of various types, it will conceivably be difficult to accomplish it in the face of an illness like undulant fever, which at the present time is of little economic importance, though of great potential significance. The larger dairies at the present time are equipped for pasteurization, and are anxious to have laws passed which will enforce this treatment of the milk. Necessarily, great opposition will be met through the farmers and smaller dairymen, who will find pasteurization an expensive expedient which might eliminate them from the competitive market unless co-operative pasteurization is employed. The hope of controlling the infection by vaccinating infected cattle or as a mode of prevention has not yet been realized. In some of the larger cities pasteurized milk is easily obtained; I am advised that 55 per cent of the milk used in Duluth is pasteurized, and that the percentage in the Twin Cities is very considerably higher.

PROBLEMS OF THE FUTURE

Several suggestions have been made, notably by Alice Evans, as a basis for future study of the disease, some of which may be enumerated:

1. All sera that are submitted for agglutination tests should be tested for undulant fever as well. This necessarily will filter out only those cases which resemble typhoid fever, and not others.

2. All fevers which are obscure, even in ambulatory cases, should have agglutination tests for undulant fever, since it is believed by some observers that the majority of the human infections are of the ambulatory type.

3. The agglutination test should be made on a large number of controls, from the population at large, to ascertain the incidence of positive reactions and the degree of titer in the non-clinical cases. This is particularly true of children, who are the most frequent users of milk, and of women who have had abortions, since it is not known at the present time what influence the disease may have in inducing abortions in the human. Routine tests of this type should be made, particularly in instances where multiple sporadic cases occur and where the distribution of infected milk can be carefully followed. It would also be helpful to make agglutination tests on all the consumers of milk supply from a positively infected herd. The infectivity of the abortus type must be extremely low or the disease would be very considerably more widespread. This test would help to establish this point. It might also help to explain the relative immunity of young children.

Abortion is a less constant symptom of abortus and melitense infection in mares according to Rinjard and Hilger,[2] and it may be that in the human this is still more true.

4. Because of the failure of the agglutination test in some cases where blood cultures subsequently prove the disease to be present, it is hoped that a test may be devised which will be more delicate than the agglutination test. Even in cattle and goats the test is not infallible. The intradermal test as tried by Fleischner and Meyer,[14] and more recently by Schoenholz and Meyer,[21] appears promising. Burnet,[3, 4, 5] of Tunis, found that the intraderman reaction was positive in the 15 to 20 per cent of the human cases of undulant fever in which the agglutination reaction had been negative. The test, however, is unsatisfactory in goats, but Holtum has reported its successful use in cattle.

5. As pointed out by Alice Evans, it would

be of value to make agglutination absorption tests in order to establish the strain which is causing the infection in the various cases, particularly where mild epidemics occur, as was true at Purdue University. The source of the organism does not necessarily determine its variety, and some believe that the undulant fever derived from cattle in Italy was really of the caprine type.

CONCLUSIONS

1. What is known as undulant fever comprises an infectious disease in man contracted from cattle affected with cattle abortion, and what was formerly known as Malta fever, derived from infected goats about the Mediterranean sea.

2. The disease is becoming widely disseminated, particularly in this country, and has a tendency to be of the abortus type in all areas except along the Mexican border, where the caprine type seems to be more prevalent.

3. Since the disease has been recognized in this country, instances of infection are being reported with greater frequency each year, so that we may consider the disease as having a potentiality for a high morbidity.

4. The abortus type appears to be of milder nature than the caprine type, but the essential clinical differences are otherwise slight. The outstanding clinical characteristics are the fever, sweating, the arthralgic pains, enlargement of the spleen and liver, and the long duration, and a frequent ambulatory type.

The laboratory characteristics are a normal white blood count or leukopenia, the tendency to a monocytosis, positive agglutination test, and a positive blood culture.

5. About thirty cases have been reported in Minnesota since the first cases were discovered in the spring of 1927.

6. Physicians should have a knowledge of the agglutination absorption test and its significance. They should also realize its failure to be positive in about fifteen or twenty per cent of the cases, in which blood cultures may be performed, or, in the future, an intradermal test employed.

7. Prophylaxis from the standpoint of exterminating the disease in cattle at the present time is impracticable and economically difficult. The economic difficulty is also a factor in bringing about an insistence on pasteurization of the milk supply. The treatment, however, is essentially preventive presently, and no specific therapeutic measure has been discovered.

BIBLIOGRAPHY

1. Bang, B.: Zeitschrift f. Thiermed. 50:241, 1897.
2. Bruce, D.: Note on the discovery of a micho-organism. Malta Fever Practitioner, 1887, xxxix, 161-170.
3. Burnet, E.: Rapports du micrococcus melitensis it du bacillus abortus de Bang. Arch. d. Inst. Pasteur de l'Afrique du Nord. Alger & Tunis, 1923, iii, 48-66.
4. Burnet, E.: Le microbe de l'avortement epizootique (B. abortus) vaccine l'homme et le singe contre le microbe de la fievre mediterraneene (M. melitensis). Compt. rend Acad. d. sc., Paris, 1924, clxxviii, 154-156.
5. Burnet, E.: Aperçu des acquisitions recentes sur la fievre mediterraneene. Bull de l'Inst. Pasteur., Paris, 1925, xxiii, 369-382.
6. Carpenter, C. M., and Merriam, H. E.: Undulant fever from brucella abortus; report of two cases. Jour. Am. Med. Assn., 1926, lxxxvii, 1269-1271.
7. Craig, C. F.: The symptomatology and diagnosis of Malta fever, with the report of additional cases. Intnl. Clin., 1906, 15, s., iv, 89-115.
8. Duncan: Brit. Med. Jour., 3352:554.
9. Evans, Alice: Further studies on bacterium abortus and related bacteria II. A comparison of bacterium abortus with bacterium bronchiesepticus and with the organism which causes Malta fever. Jour. Infect. Dis., 1918, xxii, 580-593.
10. Evans, A. C.: Human infections with organism of contagious abortion of cattle and hogs. Jour. Am. Med. Assn., lxxxviii, 630-632, Feb. 26, 1927.
11. Evans, Alice, C.: Some unsolved undulant fever problems. Read before the Lab. Sect. of the Am. Pub. Health Assn., Oct. 16, 1928.
12. Farbar, M. E., and Mathews, F. B.: An epidemic of undulant fever with a study of the associated milk supply. Ann. Int. Med., 1929, ii, 875-880.
13. Fitch, C. P.: Personal communication, 1929.
14. Fleischner, E. C., and Meyer, K. F.: Brucella abortus bovinus. Am. Jour. Dis. Child, xvi, 268, October, 1918; id. Tr. Sect. Dis. Child. Am. Med. Assn., 1918, p. 195.
15. Gentry, E. R., and Ferenbaugh, T. L.: Edemic Malta (Mediterranean) fever in Texas with the isolation of the micrococcus melitensis from two patients (Second paper). Jour. Am. Med. Assn., 57:889-1911.
16. Hardy, A. V.: Personal communication, 1929.
17. Huddleson, I. F.: Is bacterium abortus pathogenic for human beings? Jour. Am. Med. Assn., 1026, lxxxvii, 943.
18. Keefer, C. S.: Report of a case of Malta fever originating in Baltimore, Maryland. Bull. Johns Hopkins Hosp., 1924, xxxv, 6-14.
19. Larson, W. P., and Sedgwick, J. P.: The complement fixation reaction of the blood of children

and infants, using the bacillus abortus as antigen. Am. Jour. Dis. Child., 1913, vi, 326-333.
20. Rinjard, P., and Hilger, A.: Bull. l'Acad. vet. de France, Paris, 1:272.
21. Schoenholz, P., and Meyer, K. F.: Purification of abortion. Jour. Infect. Dis., xl, 453-468, March, 1927.
22. Yount, S. E., and Looney, R. N.: Malta fever, with a preliminary report on cases occurring in Arizona. Ariz. Med. Jour., 1913, i. 18-26.

DISCUSSION

Dr. C. P. Fitch (University School of Agriculture, Minneapolis): It is indeed a pleasure to have the opportunity of speaking just a moment to you. There are many reasons why there should be a close connection between human and veterinary medicine.

Undulant fever has assumed more importance following the discoveries of Miss Evans, as the paper pointed out. I want to confine my remarks to the disease as we see it in veterinary medicine, that is, in cattle and other varieties of live stock. Only a few factors can be brought out in the few moments available.

Calves are practically immune to this disease, as calves born from infected mothers are not themselves infected until they reach the age of puberty. You can feed a calf, experimentally, large numbers of the abortion germs without causing any disease in that animal. This is the basis of our control of this infection in cattle. In other words, it is a comparatively easy thing to build up a herd of free animals, animals free of this disease, from a herd of those that are infected.

Our work at the university farm has shown also that the germ is not long-lived outside the animal body. In other words, we have been able to keep an infected herd and a clean herd within fifty feet of each other in which all of the drainage from the infected herd went toward the clean herd, for a period of three years without a single infected annimal coming in the clean herd. We have several demonstration herds of this character in the state. At Duluth, at the experiment station, they have not had a reaction in their clean herd for more than nine months, and they did not make the separation until about a year ago.

There is a herd free of this infection at the State Prison at Stillwater, another one at the St. Mary's College at Winona. In other words, the plan seems to work, and we believe that the disease in cattle can be controlled on the basis of the clean herd using the agglutination test to recognize the infected animal.

Dr. Hirschboeck pointed out one interesting thing in the human family which has its counterpart in the cow. We find that a cow at or near the time of abortion fails to react to the test, but if a specimen of blood is taken approximately three weeks afterwards, a very high agglutination titre occurs. This agglutination reaction practically goes through the life of the animal. Approximately 30 per cent of the animals which harbor this disease eliminate the organism through their udder. The same infection or a similar infection exists in swine. Most abortions in swine result from the Bang organism. Fortunately that disease is not as prevalent in this state as it is in some of our neighboring states, especially Iowa.

Just recently we have had another very interesting development of the change in the character of infections produced in various species of animals by the Bang organism. For years, especially before the advent of the automobile, fistulas and poll evils were common infections of many of our equine friends. Today we don't hear quite as much about them, especially in cities, but we do hear about the pyogenic infections in our country horses. As was pointed out by two Frenchmen less than a year ago, our investigations here have shown that these pyogenic infections of horses result in over 75 per cent of the cases that we have examined to date from the Bang organism. In other words, we thought for years that these conditions resulted from pyogenic infection induced by injuries from collars, saddles, etc., but now we know that that they also result from the Bang organism.

SYMPTOMS DUE TO GROSS HEMORRHAGE INTO CYSTIC ADENOMA OF THE THYROID GLAND*

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ALMOST all adenomatous goiters removed surgically show hemorrhagic areas as well as fibrous calcareous and hyalin degeneration. Such hemorrhages, so far as we know, are only of pathologic interest. Even the pathologist ignores them, as his interest is centered on the cellular and colloid changes which are primary and related to thyroid function.

Hemorrhage directly into an adenoma may be sufficiently extensive, however, to produce clinical manifestations. When it does influence the clinical picture, it is usually in connection with the formation of cysts. Two types of thyroid cysts are recognized:[1] (1) cysts originating from hemorrhage into follicles; the walls of such cysts are formed secondarily from follicular walls, portions of the thyroid capsule, trabeculæ, and from newly formed connective tissue; and (2) cysts originating from adenomas of the thyroid gland. In such cysts the capsule of the adenoma becomes the wall of the cyst. The large cysts which require surgical removal, the group of chief interest here, are probably all of this type.

In the transition of adenoma from the fetal or colloid type to complete degeneration and the formation of cysts, apparently the following sequence occurs: (1) interference with blood supply and nutrition, (2) degeneration and necrosis, and (3) hemorrhage.

The primary factor responsible for the degenerative changes which precede the formation of cysts is the interference with the blood supply. Many of the smaller arterioles, especially the capillaries forming a network around the follicles, are blocked and do not contain blood. This apparently results from the pressure of stored colloid.[2] Degenerative changes occur in the walls of the vessel, and predispose to rupture with resulting hemorrhage. The decreased blood supply results in central necrosis. Therefore the contents of a cystic adenoma are largely the result of central necrosis and repeated hemorrhages.

Cysts are often ruptured during surgical removal. Their content may be clear and yellow; it may have a brownish or greenish tinge, or it may be bloody if recent hemorrhage has occurred. The cysts may be soft or very firm, depending on the degree of tension. Even though hard, the true character of the cyst may usually be suspected because of a certain resiliency, the result of fluid under tension. Cysts often remain the same size for years or they may increase in size with varying degrees of rapidity, dependent on recurring small hemorrhages.

If extensive hemorrhage occurs, acute enlargement of the adenoma may result. I recently became interested in a search for records of cases of acute, painful enlargements of the thyroid gland, the result of gross hemorrhage into degenerated cystic adenomas. The following abstracts of cases are illustrative of the data found.

Case 1.—A man, aged twenty years, consulted the clinic in November, 1923. Goiter had been present four or five years, with little enlargement from the time it was noticed. Eight weeks previous to his admission, following three days' exposure to a northwest wind, pain developed in the neck at the site of the goiter. For three weeks the goiter grew rapidly, and the pain continued. The patient could not turn his head. He was then free of pain for one week. Three weeks previous to the patient's visit to the clinic, the pain returned for ten days; subsequently there was pain when the wind struck the neck and there was slight difficulty in swallowing. The patient also gave a history of frequent attacks of tonsillitis. Two or three weeks before examination the goiter was much larger than at the time of admission.

Examination disclosed a large globular tumor of moderate density in the right lobe of the thyroid gland. There was no evidence of hyperthyroidism. The patient's afternoon temperature was 99°.

The surgeon found the right lobe to be cystic from recent hemorrhage. The cyst was then 8 cm. in diameter. The pathologic report was "single, hemorrhagic, cystic, almost completely degenerated adenoma."

Case 2.—A woman, aged forty-nine years, consulted the clinic in August, 1925, giving a history of recurring attacks of tonsillitis. Tonsillectomy was advised, but was not performed. Some enlargement of the thyroid gland was noted. In December of the same year the patient returned. She had had tonsillectomy elsewhere

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the previous month, following which she did not regain strength but was up and about, working part of the time. Ten days previous to her return she had not felt so well, and on wakening the following morning she noticed a large swelling, tender to touch, of the left lobe of the thyroid gland. She had had a fever of 103° for three days; slight fever continued for six days. She did not feel very ill. There was no dysphagia until the day previous to admission.

Examination revealed a globular swelling of the left lobe of the thyroid gland; it was soft and slightly tender, and had local heat. There was no fever and no evidence of hyperthyroidism during the preoperative period of observation. The diagnosis was hemorrhagic cyst of the thyroid gland, and possibly thyroiditis.

The surgeon found the right lobe to be slightly larger than normal. The left lobe contained a good-sized cyst which had probably resulted from recent acute hemorrhage. The pathologic report was "hemorrhagic, cystic, degenerated adenoma in a colloid thyroid gland."

Case 3.—A woman, aged thirty-nine years, consulted the clinic in December, 1919, complaining of symptoms not related to the thyroid gland. A small adenomatous goiter was discovered. In October, 1921, she returned to the clinic. For a year before the second visit, there had been some enlargement in the left lobe. Ten days previous to her return, the right lobe, which had always been smaller than the left, increased rapidly in size; pain in the enlarged lobe, referred to the left ear, was present. The acute enlargement had been associated with sore throat.

Examination showed a large, globular tumor in the right lobe of the thyroid gland. This was tender to pressure and rather soft and boggy. There was no evidense of hyperthyroidism. The patient's temperature was 99.2°. The diagnosis was believed to be recent hemorrhage into an adenoma.

The surgeon found a large, cystic adenoma, about 10 cm. in diameter, of the right lobe of the thyroid gland, apparently displacing the trachea and larynx, and extending slightly substernally. The adenoma was under considerable tension and ruptured on being lifted. The left lobe was normal. The pathologic report was "single, degenerated adenoma (cystic)."

In January, 1925, the patient returned. About a year after the first operation she had noticed a slight enlargement of the left lobe of the thyroid gland and this gradually increased, until about a month previous to her return. During the month it had increased a third in size. The throat had been slightly sore, and the left ear ached. There was no obstruction to breathing or difficulty in swallowing. Examination revealed a firm, globular enlargement in the left lobe, about the size of the tumor found in the right lobe at the time of the previous operation. There was no evidence of hyperthyroidism. The diagnosis was cyst of the left lobe of the thyroid gland, and probably hemorrhage into a cystic adenoma.

The surgeon found a hemorrhagic, cystic adenoma, about 10 cm. in diameter. The cyst was under considerable tension. The capsule was ruptured, the fluid evacuated, and the capsule removed, leaving a practically normal-sized lobe on the left side. The pathologic report was "completely cystic, degenerated adenoma."

Case 4.—A woman, aged fifty years, consulted the clinic January 24, 1928. Three months previous to admission she had caught cold and had had a fever for two or three days. During this time she noticed that the thyroid gland was enlarged and that it was very tender and painful. She had never noticed any enlargement of the gland previously. During the following three months the tumor had fluctuated in size noticeably. There had been a slight sensation of pressure. At the time of examination the tumor was somewhat larger than it was when first noticed.

Examination showed a hard, globular adenoma of the right lobe of the thyroid gland. There was no evidense of hyperthyroidism. The adenoma was so firm that the possibility of fluid under tension was not considered.

The surgeon found a hemorrhagic, cystic adenoma of the left lobe of the thyroid gland. The adenoma measured about 10 to 12 cm. in diameter and was under considerable tension; it was ruptured, the fluid evacuated and the capsule removed. The pathologic report was "completely cystic, degenerated adenoma."

COMMENT

In a search of the histories for predisposing factors of hemorrhage into cystic adenoma of the thyroid gland, I found that in one case exposure to a cold wind was given as the cause for the acute manifestations. There had been frequent attacks of tonsillitis, but apparently none recently. In the second case reported, tonsillectomy had been performed twenty-six days previous to the acute enlargement of the thyroid gland, and the patient had not fully recovered her health. The malaise the day preceding the acute enlargement and the temperature of 103° for three or four days afterward cannot be explained as reaction to the hemorrhage alone. The absence of any evidence of definite inflammatory reaction in the pathologic material removed would suggest that an associated general infection, possibly influenzal in type, was responsible for the fever. In the third case reported, the more gradual enlargement of the cysts had been associated in each instance with sore throat. In the fourth case an acute cold with fever accompanied the increase in the size of the adenoma.

It is rather surprising that neither in the cases reported here nor in other cases which were re-

viewed was trauma given as an immediate cause. Pain confined to the adenoma, or referred to it, was the chief complaint in all the cases. In three of the cases reported, and probably in the fourth, tenderness to palpation had been noted at the onset or was present at the time of examination. A sense of pressure without pain was noted in cases other than those reported, especially in the cases in which the enlargement of the adenoma had not been so rapid. Slight difficulty in swallowing was a symptom in two of the cases. Following the acute symptoms, the cysts became smaller and the subjective symptoms disappeared. Subsequently the size of the cysts may not change; they may fluctuate in size or gradually grow larger. In differential diagnosis, the enlargement must be distinguished from acute strumitis. In inflammatory involvement it is not expected that such a sudden, uniform increase in the size of the adenoma will occur. However, involvement of an adenoma by inflammatory reaction may occasionally simulate extensive hemorrhage into an adenoma. Recently a case of this type came under observation. The history was suggestive of hemorrhage. A discrete, firm adenoma was present, without tenderness or other evidence of inflammation. At operation the capsule of the adenoma was found to be involved in an extensive subacute inflammatory reaction.

The cases I am reporting were selected as representing the most typical instances of acute, painful enlargement of cystic adenomas of the thyroid gland, the result of hemorrhage. The fact that this phase of the condition has not been indexed is probably responsible for my inability to locate a larger number of typical cases. However, I have been impressed by the infrequency of the complication. A few cases have been observed during acute manifestations which were thought to be the result of hemorrhage, but the diagnosis could not be definitely substantiated in these cases, as operation was deferred, and the patients did not return.

In a few cases, extensive hemorrhage into an adenoma was noted at the time of operation, but a history of acute painful enlargement previous to operation had not been noted in the records.

A more complete history of the development of thyroid enlargement in all cases of cystic adenoma probably would have disclosed a much larger number of histories of acute painful enlargement some time during the course of development.

A history suggesting acute upper respiratory infection was given in three of the four cases reported. However, in the two cases in which a definite febrile reaction accompanied the painful enlargement of the thyroid gland, it is possible that the hemorrhage itself may have been responsible for some constitutional reaction, and the element of infection in the adenoma was not definitely excluded. There was some round-cell infiltration in the capsule, but there was no more evidence of inflammatory reaction in the capsule or the surrounding tissue than is found in the usual cystic degenerated adenoma of the thyroid gland.

CONCLUSIONS

1. Although of infrequent occurrence, hemorrhage of sufficient degree into a cystic adenoma will produce a rather typical clinical picture which is characterized by rapid increase in size associated with pain and tenderness.

2. In three of the four most typical cases I could locate from the records, the patients gave a history of concurrent sore throat, cold, general malaise, and, in two instances, definite fever. It must not be concluded from these limited data: (a) that an acute painful enlargement of a cystic adenoma of the thyroid gland due to hemorrhage is usually associated with a constitutional reaction; (b) that in the cases reported an upper respiratory infection was necessarily present, or if present, as the evidence would indicate, that it was necessarily an etiologic factor in the production of hemorrhage; or (c) that even in the absence of definite evidence of an inflammatory reaction in or around the tumors, it could be assumed that the presence of a local infective process was excluded: cultures from the walls of the cysts or the fluid content of the cysts were not made.

BIBLIOGRAPHY

1. Marine, David, and Lenhart, C. H.: The pathological anatomy of the human thyroid gland. Arch. Int. Med., 1911, vii, 506-535.
2. Wilson, L. B.: The pathologic classification of lesions of the thyroid gland. Ann. Clin. Med., 1922-1923, i, 44-50.

SPINAL ANESTHESIA*

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THE dangers of subarachnoid anesthesia have been very great in the past. It is only in recent years that investigations have placed it on a safety level with other forms of anesthesia. Rightly, even at present, in the minds of conservative surgeons, there is great question as to the advisability of its use. It is for this reason, that one must know and know well, the dangers to be encountered and the methods of offsetting these dangers before undertaking to administer spinal anesthesia. Those surgeons who most use this method are the very ones most cautious in its application.

However, the advantages of spinal anesthesia are so obvious to those who have observed abdominal surgical procedures under its influence that many have ventured to apply it to other regions. It is in this advancing audacity that the greatest danger lies; for men who have not mastered the finer points in the technic will be encouraged to utilize spinal anesthesia to the disadvantage of the patient. Over 3,500 operations have been performed on the head, neck and thorax under spinal anesthesia. We cannot venture to recommend this to anyone not familiar with the precautions necessary to prevent cardiac and respiratory paralysis. Its chief advantages are in connection with abdominal operations and it is below the diaphragm that it can be used with the greatest safety. Keeping the anesthetic solution in the lower levels of the spinal canal is the prime safety device. This has been accomplished with solutions of specific gravity lower than the spinal fluid and of slow diffusibility.

The advantages are: the remarkable relaxation of skeletal muscles; the constriction of the intestines; the relative bloodlessness of the viscera; the ease of manipulation for the surgeon (indeed this ease is so great that one who has not actually encountered it cannot appreciate it); the complete absence of after-effects in well conducted cases.

There are, however, certain definite disadvantages associated with spinal anesthesia and these disadvantages will in some measure determine the selection of cases for this type of anesthesia. Foremost of these is the duration of the anesthesia, which is usually limited to one hour. While this time is sufficient for many simpler surgical procedures, it is not long enough for more elaborate abdominal operations. One of the chemists of the future will make a name for himself by devising means of increasing the duration of this anesthesia. Then there is the occasional failure. This can only be accounted for by the possible deterioration of stock solutions or error in technic. The needle may half penetrate the dura allowing spinal fluid to escape, but also may permit part of the anesthetic solution to enter the tissues outside the meninges. The needle should be completely under the dura as shown in the illustration. Occasionally, too, there is backache, headache, or other minor complaint. These are less noticeable, usually, than similar complaints made after other forms of anesthesia have been administered.

There are certain conditions which respond unusually well to this form of anesthesia. Those we have considered as special indications for its use are: intestinal obstruction, cardiac disease (including decompensation), advanced pulmonary disease, hypertension and anemia.

On the other hand, there are also certain conditions which are likely to add to the difficulties encountered in administration of this anesthesia such as: low or falling blood pressure; any condition precluding the Trendelenburg position for three hours after injection of the anesthetic solution; brain tumor, spinal disease, ankylosis of the spine or other condition preventing lumbar puncture; neurotic individuals or those opposed to local anesthesia.

Its effect is greatly enhanced by preliminary narcosis with scopolamine and morphine. Often the relief from psychic stimuli is so profound that the patient is unaware that any surgical procedure has been performed. The technic of inducing spinal anesthesia is so simple as to appeal

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to every one. It is probably this which has led to the widespread advance in the use of spinal anesthesia. With the patient on the side, the table level, the head bent well toward the feet and knees drawn up under the chin, the skin is infiltrated over the desired intervertebral space with 1 per cent novocain containing 10 mm. of ephedrine. Introduce the lumbar puncture needle of fine nickel or platinum, .22 gauge. While 30 minims of spinal fluid are withdrawn slowly, fill a 2 c.c. syringe with the anesthetic solution, in amount equal to the spinal fluid withdrawn. The dosage may vary from one to three or even four decigrams of novocain; though rarely is it necessary to exceed 110 milligrams per 150 pounds of body weight. We have been accustomed to use Pitkin's formula which contains gliadin and makes it possible to use larger doses: though the direct mixing of neocain (French formula) with spinal fluid is considered by some equally safe and less fallible. The anesthetic solution is injected slowly into the subarachnoid space. Collodion is applied to the puncture site after withdrawing the needle. Place the patient on the back, lower the head of table 5-10°; prepare the abdomen for surgery while the surgeon scrubs. By the time these preparations are completed—approximately eight to 10 minutes—the anesthesia has become effective and the incision may be made. Do not inject the anesthetic solution if the spinal fluid is bloody or cloudy.

In conclusion, we wish to emphasize three facts:

1. The special indications for spinal anesthesia are those in which other forms of anesthesia are not desirable.

2. The special contraindications have to do with low blood pressure and difficulties in technic.

3. The technic of spinal anesthesia is relatively simple and is best injected with the patient horizontal and turned on the side. The patient is then placed with head down 5 to 10° and is prepared for surgery in this position. If the patient is left in this position for three hours following injection of the anesthesia, there is very little danger of a lowering of blood pressure, with cardiac or respiratory paralysis.

DISCUSSION

Dr. W. A. Coventry (Duluth): I have been very much interested in spinal anesthesia, and have used it now in about 300 to 350 cases. Our method differs a little bit from the one Mr. Bessesen has described, in that we use novocain crystals alone. We don't use the Pitkin method. There are several things that the doctor spoke about I should like to emphasize. The first is the injection of the fluid into the spinal canal. The danger that he mentioned, shown in the first picture, is quite important, which would account for probably most of your failures. It is our practice to withdraw the spinal fluid into the syringe that has the crystals in it and dissolve the crystals in the spinal fluid. Then again before injecting novocain solution more fluid to make sure that our needle is still in the spinal canal. Of course in dissolving the crystals you have to disconnect your syringe from the needle and even that little manipulation that takes place at that time may sometimes change the position of the needle so that if you are not cautious to pull out the plunger of your syringe before you reinject, failure may result. We have found that sometimes our needle does slip and we have a little difficulty in getting fluid back into the syringe again. We have never had any failures in this series of cases.

The other thing that the doctor speaks about we haven't had any trouble with. He says we must have Trendelenburg's position maintained for three hours. Immediately after injection it has been our custom to have the patient placed in the Trendelenburg's position, not any particular angle but probably a tilt of five or ten degrees. As soon as the operation is over and the patient is put back to bed, the position is not maintained. We have been able to maintain anesthesia an hour and fifteen or twenty minutes in quite a number of cases, but sometimes, if the operation extended longer than that, we have had to resort to ethylene to continue the operation. There are many advantages that the doctor speaks about that are so great that after you get sold on this proposition you have to watch your step a little bit or you are apt to get too enthusiastic. We haven't tried it anywhere but below the diaphragm. The advantage as I see it in this particular type of anesthesia is the fact that it teaches you to be more gentle with tissues than you have ever been before. Your relaxation is so great and it probably is so much less, not only to the intestines but also to the abdominal wall, in the parts to be manipulated, that the postoperative convalescence is so far superior to any other type of anesthesia, either ether or gas, that the final results are so gratifying that you are really sold on the proposition after you develop the technic.

Another thing in the injection that we found was this: When we started out we had several men giving the injections, and a man in doing spinal puncture is apt to get a little careless, so that we insist that the scrubbing up technic shall be the same as for the operative field, with the wearing of rubber gloves and sterile gown. Between the procedure of doing the injection and starting the operation you make a complete change in operative preparation. I like that method very much.

OBSTETRICAL EXPERIENCE OF A RURAL PHYSICIAN*

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MY experience in obstetrics during the past ten years has been no different from that of other rural physicians. I have, however, accurately recorded my work and am thereby enabled to summarize and analyze all cases. This report endeavors to show that modern methods, present day teaching, and recent advances in obstetrics may be practically followed in country practice, contrary to the contentions of many that only city physicians and specialists can follow them. Only by the complete utilization of the knowledge we already have can the high maternal and infant mortality and morbidity be reduced.

I have summarized the histories of 541 cases of pregnancy, including sixty-two abortions, nineteen patients who were referred to a hospital, eleven who were delivered during my absence, thirteen who moved away, and 436 patients whom I personally attended during pregnancy and confinement.

The value of prenatal care has been so widely discussed and so generally accepted that it need not be elaborated here. The statement that the expectant mother in the country will not come for advice and attention preceding labor, is disproved by my records which show that by constantly instructing my clientele they have been gradually taught to realize its worth sufficiently so that they have come to the office regularly for this purpose.

I direct your attention to the charts on Prenatal Care.

PRENATAL CARE

Year	Cases	Prenatal Care	Percentage
1920	46	15	32.6
1921	44	13	29.5
1922	59	18	30.5
1923	49	25	51.0
1924	56	39	60.9
1925	45	34	75.5
1926	64	44	68.7
1927	52	39	70.5
1928	57	43	75.4

There are frequent opportunities for suggesting to patients the value of prenatal examinations and advice. By continually working along this line it is possible for 100 per cent of all pregnant women to receive this service.

COMPLICATIONS OF PREGNANCY

I have attended sixty-two cases of abortions comprising 11.5 per cent of pregnancies. If to this is added the eleven premature deliveries it will be noted that 13.5 per cent of all gestations terminated before term. All except two were cared for in their homes. There were no infections and no deaths. In only six instances was it certain that the affair was self induced, three of which were illegitimate. Severe hemorrhage was a factor in only six cases. The period of gestation varied from six weeks to four and one-half months. There was one case of ectopic gestation treated surgically. It is interesting to note that this patient had had an ectopic pregnancy about ten years previously.

In this series there were three cases of pernicious vomiting in two of which it was necessary to empty the uterus.

In eight patients symptoms occurred threatening the termination of pregnancy. By appropriate treatment they were carried to term.

This series includes twenty-one cases of preeclamptic toxemia of pregnancy. Three patients developed convulsions, none of the three having had adequate prenatal care. Eighteen cases were recognized during the prenatal examinations, seven of these having been delivered normally in their homes, eleven were hospitalized, premature labor having been induced in four cases. Three infants died from prematurity. There were no maternal deaths. Eighteen additional cases were classed as hypertensive nephritis.

Pelvic measurements were made in all primipara, only seven cases having been recorded of moderately contracted pelvis, two of which had forceps deliveries.

In estimating the probable date of confinement the usual method was used. In nineteen cases labor occurred on the date estimated. The average "plus" error was 6.7 days, the average "minus" error was 7.4 days.

LABOR

I have been particular to always record the

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time called, the time of arrival, the hour that labor began and the hour of delivery. The following table summarizes the result:

TIME CALLED

6 A. M. to Noon	Noon to 6 P. M.	6 P. M. to Midnight	Midnight to 6 A. M.
75	80	117	122
19.4%	20.7%	29.6%	30.3%
40.1%		59.9%	

LABOR BEGAN

60	46	95	116
18.9%	14.7%	29.8%	36.6%
33.6%		66.4%	

HOUR OF DELIVERY

115	85	96	123
27.5%	20.3%	22.9%	29.3%
47.8%		52.2%	

The primiparous woman averaged twelve hours in labor; the multiparous woman seven hours (DeLee 18-12). The average time spent on each case was 4 hours and 29 minutes. The average time taken to reach the place of confinement was thirty-three minutes, this giving an approximate average of five and a half hours for each case.

This series included 128 primipara (29 per cent) and 307 multipara (71 per cent). The maximum duration of labor was fourteen hours. The average age of mothers was 28, the oldest 48, the youngest 16. There were six unmarried women. With the exception of nineteen patients who were referred to the hospital, all were taken care of in their homes. One woman was delivered in a granary, another in a box car, both of the latter having an uneventful puerperium.

Ether was used as an analgesic and anesthetic in all cases, amplified by morphine when necessary. Pituitrin was used in 204 instances (47.1 per cent), always in dosage of one to three minums, always when properly indicated. During the past five years I have been assisted by a nurse. In the practice of rural obstetrics the surroundings are often unsanitary, especially for operative work, and the help of the husband or neighbor woman insufficient. The patient is encouraged, a better anesthetic is possible, and one's surgical technic is greatly improved with the assistance of a competent nurse.

Normal labors occured in 360 instances (90.6 per cent), contrasted with 43 abnormal cases (9.7 per cent). Cephalic presentation was found 385 times (87.5 per cent); breech 11 times (2.5 per cent) and transverse in one case (0.2 per cent). Anterior positions comprised 83.8 per cent of the total; posterior positions 3.0 per cent (at the end of labor). There was one transverse or shoulder presentation and deep transverse arrest in two instances. The posterior positions required forceps delivery in 41.6 per cent. Twins occurred in seven cases (1.5 per cent), premature infants being a factor in only one instance. No forceps or versions were required in any case of twins. In one instance precipitate labor occurred, one twin delivering as a breech.

Forceps delivery was required in twenty-six cases (5.9 per cent). In no case was the so-called "high forceps" used. Version was performed in two cases. Caesarian operation was necessary in one case of ruptured uterus occuring in a patient who had previously been sent to the hospital on account of pre-ecclamptic toxemia. One patient who had had two previous Caesarian operations had a normal labor.

CHARACTER OF DELIVERY

Total number cases	433	
Twins	7	1.5%
Total number deliveries	440	
Normal labors	402	91.4%
Abnormal labors	38	8.6%

PRESENTATION AND POSITION

Cephalic	380	86.3%
LOA	338	
ROA	28	
ROP	10	
LOP	2	
Chin	2	
Breech	11	2.4%
Transverse	1	.2%
Deep transverse arrest	1	.2%
Forceps	26	5.9%
Low	18	
Mid	8	
Version	2	
Precipitates	34	
No record	13	

Perineal lacerations occurred in 144 instances (33 per cent). Of these 24 per cent were considered first degree, 3 per cent second degree,

0.3 per cent third degree (one case). Episiotomy was done frequently when indicated. The perineum was always repaired with the exception of two patients who refused the operation.

I have had two instances of retained placenta, both of which were delivered, after waiting two hours, by means of a modified Credé expression. There were three cases of partial separation of the placenta, one case of partial placenta previa, and one instance of total placenta previa (central).

Hemorrhage is recorded as moderate in twelve instances, all being readily controlled. It is my impression that careful observation and proper care of the patient for at least one hour after delivery, together with the routine administration of ergot, does much towards the prevention of post-partum hemorrhage.

This series includes two cases of puerperal septicemia, both coming to a fatal termination. One was hospitalized following hemorrhage from a complete pdacenta previa. Conservative treatment was followed but because of continued hemorrhage it was found necessary to induce labor. Version and extraction were required because of a transverse presentation.

The second case was that of a primipara with a contracted pelvis delivered by forceps with the aid of a consultant after a test of labor. An individual residing in this home was recovering from a severe ear infection and had had a mastoid operation. A relative cared for both cases and admitted having used an ear syringe not sterilized, for giving douches. One additional septic case was cared for during the pureperium only, at the request of the attending physician who was ill. It was stated that the placenta was removed manually almost immediately following delivery. A large decomposed placental fragment was expelled on the third day. A typical septic course followed, and exitus on the twenty-fifth day.

Other minor complications following labor were syncope occurring in three cases, prolapse of the cervix in two patients, edema of the vulva in one instance, measles during the pureperium suggesting for a time the possibility of septicemia, gallstone colic. One patient had an enormous ovarian cyst removed at operation not long after confinement.

INFANTS

The records of 440 infants show 224 males (50.8 per cent), 215 females (48.8 per cent) and one instance in which sex could not be determined—a monstrosity. There were 424 living births or 96.4 per cent. Premature infants numbered eleven, eight of which died. A total of sixteen infants died (3.6 per cent) from causes as follows: prematurity 8, birth injury 2, malformations 3, asphyxia (atelectasis) 3.

The average weight of male infants was 8.2 pounds (maximum 12, minimum 5); female infants 7.9 pounds (maximum 11, minimum 4). Anomalies included two monstrosities, imperforate anus, congenital blindness, cleft palate and hare lip, one infant having at birth lesions suggesting intra-uterine small pox (a premature), two infants with congenital heart lesions, one case of fascial paralysis, one of paralysis of the arm, one infant with club feet, one instance of congenital wry neck. There was one instance of a macerated dead fetus.

MEDICAL ECONOMICS

The average fee received was $29.59. The aggregate fees collected in all obstetrical cases represented 18.5 per cent of my total professional income. It is my opinion that the fee obtained in abnormal or operative obstetrics is entirely incommensurate with the character of service rendered.

CONCLUSIONS

1. Every rural physician should keep accurate records of this important part of his work. Many advantages to the public whom we serve and to the medical profession would result.
2. Accurate records cultivate the habit of accuracy of observation and tend towards better diagnosis on which the treatment depends.
3. Obstetrics consumes a large share of the rural physician's time and yields him a large share of his professional income.
4. Great responsibility is incurred not only in the management of the individual confinement but in the matter of educating the expectant mother to the value of prenatal care.
5. Prenatal care may be practically applied in the country as well as in the city and to a greater degree than has been considered possible.
6. Better obstetrics will ultimately lead to a reduction in maternal and infant mortality and morbidity.

DISCUSSION

Dr. J. C. Litzenberg (Minneapolis): A paper like

this gives me a good deal of satisfaction, because I have preached in season and out of season (I have been told out of season) that prenatal care can be observed and carried out in the country as well as in the city. The usual reply of a country practitioner to that is, "Oh, don't listen to him. He is a professor of obstetrics and a city specialist. What does he know about country practice?" They are right. What have I to say?

But when Dr. Bergheim read a paper similar to Dr. Henderson's two or three years ago I got a great deal of encouragement from it because he, a country physician, put the case even stronger than I had ever done. Dr. Henderson now comes before the Association again to prove that the country practitioner can do prenatal care and keep careful records as well as the man in the city, and if I may be allowed to interpolate I will say I believe Dr. Henderson has kept better records than the average man.

Dr. Henderson, when he started in, had less than one-third of the patients that would come for prenatal care. During the nine years of his practice he has increased that to seventy-five per cent, by educating the people, "and they like it," as he said in his paper. It isn't to be supposed that the wife of the farmer is any less appreciative of good care during her confinement than the wife of the city resident, and they appreciate good obstetrics as is shown by Dr. Henderson's figures.

If it be in order, Mr. Chairman, I should like to discontinue my discussion and read the discussion offered by Dr. Bergheim, who is confined to the hospital. If it is not out of order I should like to substitute that for my discussion for the reason that many think that a city specialist does not know anything about country practice. I want to substitute Dr. Bergheim's discussion for my own because he is a country practitioner and he has kept the same careful records as Dr. Henderson has and does the same kind of work in the country. They are not the only ones that are doing it. I commend them as exemplars. I know many country practitioners who are doing the same thing. Many others say it can't be done in the country. "These women will not come in for prenatal care," they aver. Dr. Henderson and Dr. Bergheim prove that they will.

Dr. M. C. Bergheim (Hawley, Minn.): Out of sheer enjoyment I have read and re-read Dr. Henderson's paper many times. And it is, indeed, interesting to note that his obstetrical problems are exactly like my own. They are the same problems that we all meet in this work.

Obstetrical work is the hardest work, the most tiresome work, that any physician is called upon to do. And this holds true whether one be general practitioner or specialist. And as it is the hardest, so it is also the most important work that any physician is called upon to do.

Patients must be educated to come to the doctor for prenatal care. In many sections they are not used to this sort of treatment, but it is a part of every physician's duty to educate the public in this regard.

Dr. Henderson shows that ten years ago 32 per cent of his maternity cases came in for prenatal care; and today over 75 per cent of his cases are coming in for such care. My own figures show that nine years ago less than 15 per cent came in for prenatal care, and today 83 per cent are coming in regularly. We ourselves were not educated in a day nor in a year; and neither can the laity be so educated. We must expect that years will be required before all mothers will come for prenatal care. But they can be educated. I find that most of them are glad to get the various pamphlets published for mothers, and I also find that they read them. The physician, not the grandmother or the neighbor, must be the teacher, and it is up to him to be on the alert constantly.

Over 80 per cent of all obstetrical cases in America are cared for by the general practitioners; hence, on us rests the bulk of the burden of this important work. Why should the life of one mother be sacrificed for every 162 live babies brought into this world? That is our problem! And more than four-fifths of the responsibility of solving this problem rests on those of us who are doing general practice. Rember that the fact that we are general practitioners and not specialists in obstetrics does not relieve us of any responsibility here.

The death rate among infants has been markedly reduced during the last fifteen years; but not so, to any appreciable degree, the death rate among the mothers of this country. In 1927 the infant death rate, according to the Child Health Association, was 64.9 per 1,000 babies. This is the lowest rate obtained since 1915 when the birth registration area was formed.

During the same year, 1927, over 17,000 maternal deaths occurred in the United States. Of these 38.5 per cent, or nearly 7,000, were due to puerperal septicemia—a condition which is almost entirely preventable. According to the United States Department of Commerce, 1927, 2.4 maternal deaths per 1,000 live births occurred due to puerperal septicemia.

Of maternal deaths during 1927, 27 per cent were due to puerperal toxemia. This too is almost 100 per cent avoidable, by proper prenatal care.

Intervention—surgical and otherwise—such as forceps delivery, Caesarean section, version, pituitrin and so forth accounted for 10 per cent of the deaths. Here too a decided reduction in maternal mortality can be effected.

From the above figures it certainly seems possible that by conscientious application of safe and sane obstetrical procedure we can cut the maternal death rate down 50 per cent or more.

Of the twenty nations of the world that keep vital statistics we were nineteenth in the list in 1921, and at present we are still near the bottom, as regard maternal deaths.

Great improvement has been shown where obstetrical patients receive the proper prenatal care and are delivered in good maternity hospitals. But the general maternal mortality has not been appreciably reduced. Well conducted maternity clinics and hospitals may care for thousands of cases without a single maternal

fatality. And this in spite of the fact that many of these cases are referred, difficult, cases. To reduce the death rate for the whole country we who are in general practice must face our responsibility. We must know good obstetrics and we must practice it. The laity is fast learning what good obstetrics is; and if we do not give the mothers what they ought to have they will go where they can get it.

In 1927, four states in the union (New Hampshire, Vermont, Oregon, Wyoming) had 100 per cent of their maternity cases cared for by physicians. And still the maternal death rate was higher for these states than for the United States at large. In these states it was 7.5 per 1,000 live births, while in the United States at large it was 6.2. (This last figure is .2 of a point lower than it was in 1926.) We might incidentally point with pride to our own state of Minnesota where the death rate in 1927 was 4.4, the lowest of all the states in the union. (Florida was highest with 11 per 1,000 live births.)

I have spoken of prenatal care and its importance. Let us turn to the conduct of delivery. The physician must hold himself responsible to a great extent for the injuries and accidents that happen to mother and child during delivery; and he must assume most of the responsibility for puerperal infection.

I know of one physician, not in this state, who had a suit brought against him because he had three maternal deaths in succession due to infection. He was acquitted, but nevertheless he must have felt that he was not "without guilt."

I know of one physician who, at a recent meeting of a number of physicians, spoke of Dr. J. C. Litzenberg as being a crank on the subject of obstetrics because he even went so far as to advocate rectal examinations in these cases.

A doctor who is in general practice must handle all sorts of cases. When dealing with cases of erysipelas or other virulent infectious cases he must be doubly careful in his obstetrical work. Virulent streptococci can not be scrubbed off the hands nor killed by lysol or bichlorid or other disinfecting solutions. At every case sterile gloves should be carefully put on. Rectal examinations should be done, and vaginal examinations resorted to only when absolutely necessary, and all unnecessary intervention should be abstained from, especially when one is dealing with virulent infections in his general practice.

Speaking of experiences—Dr. Henderson keeps wonderful records of his cases. He has pointed out his cautious use of pituitrin. When he uses this potent and dangerous extract he uses from one to three drops as an initial dose. His cases of intervention have been reduced almost to a minimum. In looking over my own records I find that in 876 cases pituitrin was used very rarely and very cautiously, and forceps were used in 14 cases only, or in 1.6 per cent of the cases. I have spent a longer time on the average for each of my cases than most doctors do. I believe in watching and waiting. When things are progressing nicely and the mother and the child are in good condition, why apply forceps to save a little time and probably do great injury and implant virulent infection? Or why resort to larger doses of pituitrin and be sorry for it afterwards? (There are three of us doctors in the little town of Hawley; and when I am spending a little extra time on an obstetrical case, the other doctors can take care of my other patients if they can not wait. And when the other doctors are on obstetrical cases I can do the same for them. It is tit for tat.)

While I was an intern we had a case on the obstetrical service with partially retained placenta. There was profuse hemorrhage which could not be controlled. The patient was becoming cyanotic, and was rapidly losing consciousness. The chief of the obstetrical service who was in charge of the case removed the placenta manually, the uterus was massaged, aseptic ergot was given hypodermically, and the life was saved. This was a mighty lesson for me. Ever since I got into practice, I have, in all my obstetrical cases had on hand an extra pair of sterile gloves and aseptic ergo for use in just such cases. I have positively saved the lives of two mothers in this manner. In only two cases have I been obliged to remove the placenta manually, and in both of these cases the result would have been fatal had I not been prepared. Neither one was infected, both were saved; and if I have done nothing else during my medical practice I have at least saved two mothers, each with a family of six children.

All practitioners of medicine should follow the Golden Rule; especially so in doing obstetrical work. If every doctor doing obstetrical work would think of the mother as though she were a member of his own family, and treat her exactly as he would want his wife or daughter or sister to be treated he would not think selfishly of himself, or his sleep, or his golf game. He would think of the mother who is in travail rather than of himself. He would remember that he is well, while she is sick and entrusted to his care. He would make it a point to know good obstetrics and to practice the same. He would wait and watch, he would give nature a chance, and assist her when necessary only. Pituitrin and forceps and versions and other forms of intervention are too often used to help the doctor rather than the patient.

In conclusion, let me emphasize again what the doctor has brought out so well in his good paper: prenatal work is the most important part of obstetrics. Forty years ago when so few mothers had the help of a doctor at delivery the chief cause of death was not that they went through labor unassisted; the chief causes were the complications which set in during pregnancy, and which could in most cases have been prevented by conscientious application of our modern prenatal care. It is up to the doctor to educate the laity. It can be done. It is being done. I am reluctant about attending a confinement case that has had no prenatal care. And if patients were made to understand that if they failed to come in for prenatal care they would have difficulty in getting a doctor at the time of delivery, I believe they would all come in. If all of the 2,700 or more physicians in Minnesota thus insisted I believe there would be few cases failing to come in for prenatal care.

I am both serious and enthusiastic about this subject of good obstetrics among general practitioners. And for that reason I have probably burdened you with many words. I thank you.

REFERENCES

Magazine	Date	Page
The Journal of the American Medical Association	Dec. 3, 1927	1977
"	Dec. 10, 1927	2017–2056
"	Nov. 24, 1928	1587–1655
"	Oct. 13, 1928	1137
"	Sept. 1, 1928	655
"	Sept. 8, 1928	753
"	Aug. 11, 1928	411
"	Aug. 18, 1928	502
"	June 2, 1928	1801
"	Mar. 24, 1928	993
"	Mar. 30, 1928	1136
"	Jan. 26, 1929	323
Minnesota Medicine	Oct., 1928	690

Obstetrics and the General Practitioner, by M. C. Bergheim, M.D., Oct. 1923.

Dr. Litzenberg: I shall no longer need to preach the doctrine of prenatal care to the country practitioner. I had to do it when there was no one else to do it and they laughed at me and said it couldn't be done. Now we have in the country districts of the state of Minnesota a number of apostles of good obstetrics and prenatal care and I am very happy that these country doctors are taking up the burden of spreading the propaganda that, in order to lower maternal mortality and infant mortality, prenatal care must be carried out, and the example of Dr. Henderson and Dr. Bergheim and dozens of others proves that good obstetrics and good medicine can be practised in the country, just as well as good medicine can be practised in the city. There isn't any reason why we can't educate these people as men of this type are doing. I think so much of the paper of Dr. Henderson that I have invited Dr. Henderson to come and give a lecture to the senior students on "How to Practice Obstetrics in the Country," and I think medical students will enjoy it as much as I have enjoyed his paper.

VIOSTEROL: IRRADIATED ERGOSTEROL

The demonstration that many food materials can acquire physiologic potencies when the products are subjected to the direct influence of ultra-violet rays is a contribution of recent scientific investigation. The effects of the irradiated substances within the body are identical with, or equivalent to, those that have been ascribed to vitamin D, the antirachitic food factor. The latter is known to induce the healing of rickets or to prevent the latter when suitable foods containing vitamin D, such as cod liver oil, are employed in a prophylactic way. Tetany and probably other diseases may be favorably influenced in a comparable manner. Ergosterol, a sterol widely present in small amounts in edible products, was shown to be "provitamin" or substance that acquired antirachitic potency after suitable irradiation. It was inevitable that a product possessing the remarkable action of irradiated ergosterol and readily obtainable should attract attention in the fields of therapy and prophylaxis; also, the danger of quackery follows in the wake of discovery, particularly when, as in the case of irradiated ergosterol, the product possesses enormous potency. To avert the almost inevitable confusion and to exercise a wholesome restraint over the exploitation of the new product, the Council on Pharmacy and Chemistry of the American Medical Association has followed its usual custom of adopting a common name, viosterol, for irradiated ergosterol. It has recognized two preparations of this substance, namely, viosterol in oil 100 D (N. N. R.), having one hundred times the antirachitic potency of a standard cod liver oil; and cod liver oil with viosterol 5 D (N. N. R.), being cod liver oil with the addition of viosterol and having five times the antirachitic potency of a standard cod liver oil. In announcing this action, the Council publishes standards of identity, dosage, and suggestions for therapeutic use. The use of products accepted for New and Non-official Remedies, according to the advices of the Council, is likely to avert any undesirable consequences from the use of this potent agent. (Jour. A. M. A., August 31, 1929, p. 694.)

President's Letter

The Committee on the Cost of Medical Care

THIS group, of which Dr. Ray Lyman Wilbur, President of Stanford University, is chairman and C. E. A. Winslow, Dr. P. H., Chairman of the Executive Committee, has outlined a most comprehensive five-year program, which includes studies of urban and rural communities in every phase of the cost of medical care, including physician's fees, hospital charges, special service as *x*-ray, dental work, operations, etc. One wonders if the cost of medical care has increased in greater proportion than other commodities. Recent articles in lay magazines would lead one to the conclusion that cases therein cited are exceptional. Due consideration must be given to the vastly increased cost borne by the physician in conducting a practice, the cost of up-to-date equipment, trained assistants, et cetera. If one compares the cost of hospitalization with rates charged by hotels of equal grade, it would appear that the hospital charge is unusually low, including, as it does, in addition to room, food and nursing service.

The list of studies comprise:

I.

Preliminary survey of data showing the incidencc of disease and disability requiring medical services and of generally existing facilities for dealing with them.

*1. The diseases and conditions responsible for human disability and inefficiency.
2. The prevalence of certain disorders which appear to be among the most serious causes of disability and inefficiency.
3. The proportion of persons, both adults and school children, not disabled, who are in need of medical service.
*4. Existing facilities for the treatment and prevention of disease and defectiveness—a statistical study.
*5. Surveys of the medical services of a large city, of a small city, and of rural community.

II.

Studies on the cost to the family of medical services and return *accruing to the physician and other agents furnishing such services.*

*6. The cost of sickness, during a 12 month period, among various representative population groups, including the incidence of sickness.
7. The influence of specialization on the cost of medical service.
8. The cost of adequate medical service for a family during a 12 months period.
*9. Capital investment and income in private practice.
*10. Capital investment in hospitals and clinics.

III.

Analysis of specially organized facilities for medical care now serving particular groups of the population.

*11. Organized medical service in industry and in universities.
*12. Pay clinics and group clinics.
13. Recent developments in services rendered to persons not indigent by state, municipal, and county hospitals.
14. Visiting nurse societies.
15. School health service.
16. The extent of private medical service on a yearly basis.
17. Existing types of health insurance in the United States.

*Studies in this list which are preceded by a star are to be given priority.

The committee invite the coöperation of individuals, research and business organizations. This is a subject which interests every one of us and it is hoped that the committee may meet with a hearty response. The final report will be awaited with interest.

President,
Minnesota State Medical Association.

EDITORIAL

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CARBON DIOXIDE IN PREVENTION OF POSTOPERATIVE PULMONARY COMPLICATIONS

The use of carbon dioxide in anesthesia has been investigated from two viewpoints: as a means of inducing deep breathing and as a means, in itself, of producing anesthesia. Recent work in the latter field indicates that "anesthesia with carbon dioxide and oxygen is not recommended for human use until much more extensive studies have shown its limitations and its possible field of service."[3] However, as long ago as 1908, Henderson pointed out the influence of the carbon dioxide content of the blood in regulating heart rate, vascular tonus, peristalsis of the alimentary canal, respiration, and other bodily functions.[1]

A forward step in methods of anesthesia which grew out of this work was the introduction of carbon dioxide as a respiratory stimulant. Levi was using it in 1910. Throughout approximately the succeeding twenty years, Henderson and Haggard and their associates repeatedly have called attention to the value of inhalation of carbon dioxide as a means of resuscitation in asphyxia and as a means of inducing deep breathing after anesthesia.

Demonstration of the importance of deep breathing after anesthesia rests on the physiologic grounds that recently have been presented by Henderson[2]. Normally, the lungs are well drained through their airways and these channels of drainage should be kept open. Deep breathing tends to keep them patent; shallow breathing predisposes to bronchial obstruction and consequent atelectasis and pneumonia. The air passages clear themselves not only by means of the cough reflex and by the action of cilia, but also by peristaltic activity in the air sacs, bronchioles and bronchi. It is possible, also, that by means of a nervous mechanism, not thoroughly understood as yet, a stimulus which reflexly will incite deep breathing also will cause an increase in the caliber of the air tubes, and that a stimulus which tends toward shallow breathing will tend to decrease the caliber of the air passages.

At present, therefore, carbon dioxide is being administered at the end of anesthesia for surgical operations. It is being used in this country and in Europe and postoperative pulmonary complications are becoming hazards of the past. In August of this year, Lundy wrote: "Carbon dioxide was used in many more cases in 1928 than in 1927 or any previous year. It was not used as an anesthetic, but as a respiratory stimulant, and it is the almost unanimous opinion of every one in the Section on Anesthesia at the clinic that carbon dioxide is a valuable agent on a gas machine, and that in a large percentage of cases in which a general anesthetic is being used it will facilitate the administration of the anesthetic at one or more times during the period of anestheti-

zation." On the service conducted by Lundy and McCuskey, carbon dioxide is employed as a preventive of atelectasis and pneumonia as follows: Immediately after the anesthetic has been discontinued and before the patient is removed from the table, a mixture of carbon dioxide approximately 10 per cent and oxygen 90 per cent, is given for from three to five minutes.

R. M. Hewitt, M.D.

BIBLIOGRAPHY

1. Gwathmey, J. T.: Anesthesia. Ed. 2, New York, Macmillan, 1924, p. 97.
2. Henderson, Yandell: The physiology of atelectasis. Jour. Am. Med. Assn., 1929, xciii, 96.
3. Leake, C. D.: The anesthetic properties of carbon dioxid. Current Res. Anesth. and Anal., 1929, viii, 17.
4. Levi, Ettore: Quoted by Gwathmey, p. 98.
5. Lundy, J. S.: Data concerning the use of various anesthetics in The Mayo Clinic in 1928. Surg. Clin. N. Amer., 1929, ix, 946.

COUNTY SOCIETY MEETINGS

The general let-up in the activities of the medical societies incident to the summer season has come to a close, and the usual stride has again been resumed in medical circles.

The success of the county society meeting depends largely on the type of program presented. In these days when the county society is meeting with competition from various sources, hospital staff meetings in particular, it behooves the program committee of the society, which in most instances consists of the county society secretary, to show added zest in arranging first class scientific programs. Competition should act as a stimulus here as it does elsewhere. We know of one secretary who at the beginning of the year called on certain members for participation in the program on certain dates, with marked success. Full programs are more likely to be obtained through this method than by waiting for volunteers. The secretary of the State Medical Association may be called upon to assist in obtaining outside talent to add to the interest of the county meetings.

With added interest in economic questions some secretaries have held a medical economics meeting during the year to which local physicians outside of the society membership as well as members were invited. This has been in a number of instances the means of adding desirable physicians to the society membership. State officers and committee members have shown in the past a remarkable willingness to attend these special meetings to discuss various economic questions.

The county society means most to the individual members who put something into the society by attendance and participation in the various activities of the society, scientific and otherwise.

POISONING FROM REFRIGERATION SYSTEMS

A number of deaths have been recently reported in the press as being due to poisoning by the leakage of gas from refrigerating plants. The more complex modern living conditions become, the more varied the possible accidents.

A clear explanation of the real hazard existing in the popular present day refrigeration methods is contained in a statement authorized jointly by the Public Health Service, the Bureau of Standards and the Bureau of Mines.

Formerly ammonia was the gas commonly used as a refrigerant. Now, the gases sulphur dioxide and methyl chloride are extensively used. None of these gases is a violent poison. Being very volatile, they are not likely to cause poisoning through contact with food, but they cannot be breathed with impunity. Ammonia and sulphur dioxide have an easily detectable and disagreeable odor, while methyl chloride has only a slight and not unpleasant odor. Hence, the greater hazard from the methyl chloride in case a leak in a refrigeration system occurs.

Most of the accidents reported have been in Chicago and have been in connection with multiple refrigeration systems where the gas has been forced to a number of refrigerators. On the other hand the majority of individual household refrigerators which are electric driven utilize sulphur dioxide.

Inasmuch as the use of methyl chloride constitutes the real danger it is reasonable to suppose that steps will be taken either to substitute gases readily detectable by their odors for the methyl chloride used or to add to the methyl chloride some other gas which will be readily detectable in case of a leak. It is not logical to assume that refrigeration systems can be so perfected as absolutely to preclude the possibility of leakage.

MISCELLANEOUS

MINNESOTA STATE MEDICAL ASSOCIATION POST GRADUATE EXTENSION COURSES

N. O. Pearce, M.D., Chairman,
Committee on Hospitals and Medical Education

Various state and county medical societies throughout the United States have awakened to the necessity of the society as an organization developing definite programs of graduate instruction for its members. The virtue of a well-planned, systematized program on any phase of medical education, presented to society members by competent men who have the ability as teachers, is now recognized as the best means of keeping the membership informed, and undoubtedly raises the plane of the medical practice in the community.

It has now become a settled part of the program of the Minnesota State Medical Association and the Medical School of the University of Minnesota to coöperate in organizing and administering short courses of postgraduate instruction in the several medical and surgical branches for the benefit of general practitioners.

The University of Minnesota Medical School, through the administrative agency of the General Extension Division, has for some years conducted short postgraduate courses of from three days to two weeks on its own campus. Large numbers of the profession attend these courses yearly and we are confident that they are the best form of review work available for the general practitioner.

However, for the benefit of those who are unable to come to the University to take advantage of these courses, the Medical School and the State Medical Association are now offering the component county organizations of the State Medical Association an opportunity of having at home postgraduate courses as a regular part of their year's educational program. These courses are a proven success in Minnesota. They are now so well organized, under the administration of the Extension Division of the University of Minnesota, and the plan so perfected that we are prepared to offer an excellent program at a minimum cost. Many county societies are now organized for the fall courses. This is an ideal time of the year and all groups who contemplate any educational program this year should be getting under way.

GENERAL PLAN

The plan of operation contains the following features. All plans, however, are subject to alteration to suit the needs of local organizations.

1. Ordinarily the courses are organized and conducted through the Committee on Hospital and Medical Education of the local medical society where such committees have been appointed; and where such committees have not been appointed, they should be appointed at once. Where it is now practical to organize a course under the auspices of the local society, any group of physicians, who are members of the state association, may organize themselves accordng to the same plan as outlined for the county society. One man should be selected as secretary or local manager; he should conduct the correspondence and make all local arrangements.

2. The courses are planned to meet one day each week for as many weeks as the class may elect. The time is to be occupied either with morning clinics and afternoon lectures, or afternoon clinics with evening lectures. Normally each clinician may be expected to hold a clinic occupying from one to two hours, and to deliver a lecture or lantern slide demonstration occupying about the same time. Either one or two subjects and lectures may be had for each meeting.

3. It is not desirable to plan for less than an eight-week program, which would mean sixteen subjects with two lecturers, or eight subjects with one. The class may exercise the privilege of selecting subjects and instructors from the list prepared by the University. Should there be some local man who is desired for some subject on the program, this can be readily arranged.

4. The cost of each course can be approximately computed by ascertaining the round trip railroad fare and ordinary traveling and living expenses from the home of each instructor selected, adding a slight overhead for the administrative work of the Extension Division. The instructor may come by train, bus, or his own automobile, but the expense is figured on the basis of the railroad fare. It is understood that the instructor serves without compensation.

5. If the course can be arranged for two adjacent centers on consecutive days with the same subjects, the cost will be considerably reduced.

6. It is the duty of the local center to provide a place for the clinics and lectures, and to see that the necessary clinical material is provided. The responsibility for furnishing the necessary clinical material is on the local center. Directions will be sent setting forth clearly the preparatory work that is expected on patients before they are presented for the clinic. When a stereopticon is needed, the local center is expected to provide it.

7. When the local committee has decided upon the number of days and subjects, and has completed registration for the class, the committee may select the day of the week, and the hour at which they wish the clinic or lecture to commence. It is advisable that arrangements be made so that the instructor will be on the ground at least two hours before the time for the clinic so that he may go over the cases with the local men before attempting to present them to the class. Plans should always be made with an eye to the arrival and departure of trains.

8. A printed list of instructors, with a very brief outline of the subjects to be presented, will be mailed on request.

9. As soon as the subjects for the course have been selected, the local committee should forward the list to the Extension Division of the University of Minnesota, indicating first, second, and third choice, and the exact cost of the course will be computed. Upon receipt of this, the local committee should collect the required amount from the class and send it in to the

Extension Division. Payment in full is expected before the course begins. All checks should be made payable to the University of Minnesota.

10. If a conservative or sequential course on one general subject by one man is desired, it is probable that it can be furnished. Special arrangements should be made for this form of course through the Extension Division of the University. Correspondence with the committee is invited on subjects not listed in this circular.

11. Material for county or sectional medical society programs may be selected from this list and arranged through the Extension Division.

12. All correspondence relative to the organization of these courses should be directed to Mr. T. A. H. Teeter, acting director of the Extension Division of the University of Minnesota.

All inquiries relative to instructors or subjects should be directed to Dr. N. O. Pearce, 823 Nicollet Avenue, Minneapolis, Minnesota.

POST GRADUATE COURSES IN TUBERCULOSIS

Six one-day post graduate courses in tuberculosis for Minnesota physicians have been announced by the Minnesota State Medical Association, various district sanatoria, and the Minnesota Public Health Association, to be held during October and November.

The short courses, part of the extension educational program of the medical society, and the Christmas seal work in the state, will take place: October 24, Pokegama sanatorium, Pine City; October 29, Ottertail County sanatorium will coöperate with Fair Oaks Lodge sanatorium, at Wadena; October 30, Sand Beach sanatorium, Lake Park; October 31, Sunnyrest sanatorium, Crookston; November 8, Southwestern Minnesota sanatorium, Worthington; and November 13, state sanatorium, Walker.

The success of similar previous courses held last year warranted the extension of the plan.

Discussion of recent progress in the treatment of tuberculosis will be included in the general program. The courses will offer lectures on gastro-intestinal tuberculosis, management of tuberculosis, the disease in children, sanatorium care and management, *x*-ray diagnosis, and chest surgery. Afternoon programs will consist of case examinations and clinical demonstrations.

A number of Minnesota physicians are to take part in the program. They will include: Dr. J. A. Myers, chief of chest clinic, University of Minnesota, and medical director of Lymanhurst School for Tuberculous Children, Minneapolis; Dr. C. B. Wright, associate professor preventive medicine, University of Minnesota; Dr. H. A. Burns, superintendent of the state sanatorium, Ah Gwah Ching; Dr. Arnold Anderson, executive secretary, Tuberculosis Division, State Board of Control; Dr. H. L. Taylor, past president, National Tuberculosis Association; Dr. L. G. Rigler, chief of department of roentgenology, University of Minnesota; Dr. George Earl, chairman of the health education committee of the state medical association; Drs. F. F. Callahan, R. G. Allison, and E. K. Geer, members of the staff of Pokegama sanatorium; Dr. S. A. Slater, superintendent, and Dr. L. A. Jordan, assistant superintendent, Southwestern Minnesota sanatorium, Worthington; Dr. W. S. Broker, superintendent, Ottertail County sanatorium, Battle Lake; Dr. L. H. Flancher, superintendent, Sand Beach sanatorium, Lake Park; Dr. W. G. Paradis, superintendent, Sunnyrest sanatorium, Crookston; Dr. W. A. O'Brien, associate professor of pathology, University of Minnesota; Dr. Fred Kumm, superintendent Fair Oaks Lodge sanatorium, Wadena.

Minnesota physicians desiring to register for any one of the courses are urged to enroll with the Minnesota Public Health Association, 11 West Summit Avenue, St. Paul, Minnesota.

The state Christmas seal organization is also arranging public health meetings and institutes in conjunction with the series of courses.

EDUCATIONAL EXHIBIT—CANCER INSTITUTE

The Cancer Institute, University Hospitals, University of Minnesota, will conduct an educational exhibit during the meetings of the American Public Health Association which will be of interest to both the profession and the laity. This exhibit will include demonstration of various methods of applying radium to the body, daily demonstrations, 3 to 5 p. m., of the measurement of radium radiation by the electroscope, shown by Dr. W. K. Stenstrom and his associate physicists; and daily demonstrations, 10 to 12 a. m., of the appearance of cancer under the microscope, by Dr. W. A. O'Brien. The Canti film will be demonstrated by Dr. A. C. Strachauer, Director of the Cancer Institute.

The American Society for the Control of Cancer, New York, will demonstrate their educational campaign methods which are addressed particularly to the public. Dr. C. C. Little, former president of the University of Michigan, but recently elected Managing Director of the Society, will attend the meetings and will be the guest of Dr. Strachauer.

OF GENERAL INTEREST

Dr. John O. Taft of Minneapolis returned home in September from a four months' visit in Europe.

Dr. J. P. Schneider of Minneapolis with his family is spending a year on the Pacific Coast. He is at present living in Hollywood, California.

Miss Anne Elizabeth White, daughter of Dr. and Mrs. S. Marx White of Minneapolis, and Herbert Wilson Rogers of Minneapolis were married at the home of Dr. and Mrs. White, September 14.

Dr. C. W. Froats of the More Hospital, Eveleth, Minnesota, has been awarded a fellowship in obstetrics and gynecology at the University of Minnesota, service to begin October 1, 1929, at the Ancker Hospital, Saint Paul.

Dr. Robert A. Strong, editor of the International Medical Digest, has been appointed professor of pediatrics and head of the department of pediatrics of Tulane University School of Medicine, New Orleans, Louisiana.

Dr. C. C. Chatterton and Dr. W. H. Von Der Weyer of Saint Paul moved their offices to 746 Lowry Medical Arts Building from the Moore block, September 1. They will continue the practice of orthopedics in their new location.

Dr. C. C. Tyrrell of Minneapolis, who has been in the West since January, has returned and resumed his practice in Northeast Minneapolis. Dr. Tyrrell is one of the oldest in point of service of the physicians in his part of the city.

Among Minneapolis physicians and their wives who have returned from a summer spent in the medical centers of Europe are Dr. and Mrs. Arthur E. Smith, Dr. and Mrs. James A. Johnson, Dr. and Mrs. F. G. Benn, and Dr. and Mrs. Louis R. Koller.

Dr. Dexter Lufkin of Saint Paul, who recently completed his internship at Ancker hospital, has been named assistant superintendent of the Kula sanitarium at the island of Maui, Hawaii. Dr. Lufkin sailed from Vancouver in September to assume his duties at the sanitarium.

The wedding of Dr. Joseph Hume Taylor of Minneapolis to Miss Constance Van Camp Whitney, daughter of Dr. and Mrs. Arthur W. Whitney of Saint Paul, took place in Saint Paul, August 18, 1929. Dr. and Mrs. Taylor are now at home at the Oak Grove Hotel, Minneapolis.

Dr. and Mrs. Leo J. Madsen of Santa Monica, California, are the parents of a baby son, Leo Madsen, Jr., born August 21, 1929. Dr. and Mrs. Madsen were formerly residents of Minneapolis and Rochester, Minnesota, where Dr. Madsen was associated with the Mayo Clinic.

Dr. Earle T. Dewey of Little Falls and Miss Margaret Mary Bloom of Minneapolis were married in August. Dr. and Mrs. Dewey will make their home in Palo Alto, California, where Dr. Dewey will be a member of the faculty of the medical school of Leland Stanford university.

Dr. W. A. Colton, formerly clinical director of the United States Veterans' Bureau Hospital at Castle Point, N. Y., has become the clinical director of the Veterans' Bureau Hospital at Fort Snelling. Dr. Colton succeeds Dr. Charles E. Hughes, who is now located in Maywood, Illinois.

Miss Helen Norris of Minneapolis, sister of Dr. E. H. Norris, Saint Paul, has been appointed secretary of the Hennepin County Medical Society and will have charge of the society's library. Miss Norris is a graduate of the University of Minnesota and the Library School, Albany, New York.

Dr. Fred L. Adair of Minneapolis, who has been a faculty member of the medical school of the University of Minnesota since 1904, has resigned his position as professor of obstetrics and gynecology to accept a similar position with the University of Chicago. Dr. Adair assumes his new position October 1.

An item of interest to Hennepin county physicians appeared in the column headed "Fifty Years Ago Today" in the September 10 issue of the *Minneapolis Journal* as follows: "Physicians and surgeons of Hennepin county are to meet next week to organize a medical association. Dr. S. F. Hance is slated for the presidency of the new group. Medical men of the county who are directing the organization work include: Dr. Calvin G. Goodrich, Dr. F. A. Dunsmoor, Dr. H. H. Kimball, Dr. G. A. Lamb and Dr. C. W. Myers."

A conference school on an inactive duty basis without pay is to be established at Rochester, Minnesota, for medical reserve officers from November 4 to November 17. This school will be under the direction of the Surgeon of the Seventh Corps Area and his assistants. The school will cover subjects such as are given at the summer training camps at Fort Snelling. The conferences will begin at 1:00 o'clock in the afternoon and occupy the afternoon and evening to cover the work. Each period will be occupied by a reserve officer giving his conference subject, after which the subject will be discussed.

This school is given for the purpose of training reserve officers who are not able to attend the summer camps and wish to get the required number of hours in their grade during their period of appointment. Ninety-eight hours of credit will be given for the course.

Anyone interested should communicate with Colonel L. B. Wilson, Mayo Foundation, Rochester, Minn.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Our Newspaper Service

We are viewed by Minnesota weeklies as follows:

Printing Propaganda

"An exchange prides itself on never using as news the bulletins sent out by the Minnesota State Medical Association. The bulletins carry concealed advertising, is the reason. Also M.D.'s don't advertise.

"Every exchange reaching the Pilot carries news stories sent from various sources which contain advertising. Bulletins from the Highway News perhaps lead all others. In nearly every story is concealed propaganda—advertising. Much news is contained in the bulletins. Still the fact remains that they are propaganda.

"Right now the state fair is getting three columns of free advertising to every one paid for in country newspapers. The farm bureau has a weekly free booster story. The Ten Thousand Lakes outfit gets its advertising printed free—in Minnesota weeklies. Last week in over 25 exchanges ran the story of how Sears Roebuck was sponsoring a canning contest. Probably not one of the exchanges mentioned has failed to take a crack at the big mail order outfit when opportunity offered and not one but has suffered, at least indirectly, by the catalogue competition. Still they all placed Sears Roebuck in a philanthropic light—free—because the copy came to them already written.

"The Pilot often prints as news the Medical Association's bulletins. That it helps the M.D.'s, who do not advertise, is not considered at all. The cheap, obnoxious patent medicine advertisements that many of us poorer country weeklies and cheap magazines are compelled to print, and which many larger papers desire, are enough to drive reputable doctors from advertising columns. Then, too, daily papers find it lucrative to buy a doctor's advice through a syndicate; the association is free."

Professional Ethics is a Funny Thing, Isn't It?

"Physicians and surgeons, for instance, do not 'advertise.' That is, they do not run even cards, in a great many newspapers giving information that the public might and does want, location of office, telephone numbers and other information that would be of great importance in case of an emergency, for instance. Such 'advertising' is unethical, whatever that may mean in that case.

"But the Minnesota State Medical Association maintains a press bureau, which regularly sends out bulletins to the press, giving certain symptoms of divers diseases, and almost invariably advising that anyone having those symptoms should posthaste call the family physician, and always weaving into the story somewhere that this information is given out by the State Medical Association.

"Of course, that is not 'advertising,' because its publication is not to be paid for—but otherwise why maintain the publicity staff and office? The printing or mimeographing must be paid for, the paper and envelopes used and the postage and undoubtedly the writers of the propaganda, for that is what it is; but it would be unethical to carry legitimate advertising in newspapers and periodicals.

"It's too deep for me, I give it up."

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA MEDICAL ALUMNI ASSOCIATION

A homecoming program is being arranged for the members of the Minnesota Alumni Association beginning Friday, November 15, 1929, the day before the Homecoming football game with the University of Michigan.

A scientific program to be held in the Eustis Memorial Auditorium on Friday will include papers, each to be a half hour in length with no discussion, by the following men: From the University, Drs. Leo Rigler, Owen Wangensteen, J. C. Litzenberg, S. E. Sweitzer, Emil Geist and Frank Burch; from Saint Paul, Drs. W. R. Shannon and E. M. Hammes; from Minneapolis, Dr. G. D. Head; from Duluth, Dr. E. L. Tuohy; from Rochester, Dr. W. F. Braasch. Dr. Jay Durand, Minnesota alumnus from Seattle, and Dr. Otto Folin, Minnesota alumnus at Harvard medical school, will also be present.

A luncheon will be served at the University Hospital at noon Friday. There will be a dinner in the evening with entertainment.

Saturday morning will be devoted to a business session at the medical school, followed by a luncheon and attendance at the Michigan-Minnesota football game.

Every alumnus of the University of Minnesota medical school is urged to attend. Plans are being made for as good if not a better get-together than was held last year, according to an announcement by the president, Dr. Oswald Wyatt.

AMERICAN COLLEGE OF SURGEONS

The American College of Surgeons will hold its nineteenth annual Clinical Congress in Chicago, October 14-18. Headquarters will be at the Stevens Hotel. An intensive program is being planned to make this home-coming event the greatest in the history of the College.

The Hospital Standardization Conference will consist of morning and afternoon sessions on Monday to Thursday inclusive. There will be a series of clinical demonstrations given by: George W. Crile, Cleveland; John B. Deaver, Philadelphia; John M. T. Finney, Baltimore; Charles H. Mayo, Rochester, and others.

Monday evening's program will include an address of welcome by the Chairman of the Chicago Committee on Arrangements, Dr. Herman L. Kretschmer, the address of the retiring President, Dr. Franklin H. Martin, Chicago, the inaugural address of the new President, Major-General Merritte W. Ireland, Washington, D. C., and the John B. Murphy Oration in Surgery by Professor D. P. W. Wilkie of Edinburgh. Among the foreign visitors will be: Dr. James Heyman of Stockholm, Dr. Thierry de Martel of Paris, Visconte Aguilar of Madrid, and Mr. Herbert Tilley of London. Tuesday, Wednesday and Thursday evening sessions will consist of scientific papers presented by surgeons from the United States, Canada and from abroad. The Annual Convocation of the College will be held on Friday evening.

The Fellowship Address will be delivered by Dr. Glenn Frank, President of the University of Wisconsin. The annual meeting of the Governors and Fellows will be held Thursday afternoon followed by a symposium on cancer and bone sarcoma. An all day session on Traumatic Surgery will be held on Friday in which leaders in industry, labor, indemnity organizations and the medical profession will participate. A special program has been arranged that will be of interest to those whose practice is limited to surgery of the eye, ear, nose and throat.

A feature of the Congress will be the showing of surgical films that have been produced under the supervision and approved by the Board on Medical Motion Pictures of the College. New developments in color photography will be demonstrated.

In addition to the commercial exhibits, there will be scientific exhibits by the departments of the College.

A rate of one and one-half the regular one way fare has been granted on railroads of the United States and Canada to those holding convention certificates.

ST. LOUIS COUNTY MEDICAL SOCIETY

The regular summer range meeting and outing of the St. Louis County Medical Society was held this year on Saturday, August 17, at Lake Esquagama. About forty members, with their wives and families, were in attendance.

During the day a golf tournament was held, Dr. Charles B. Lenont, of Virginia, acting as Master of Ceremonies. Dr. C. N. McCloud was awarded first prize. At the scientific meeting, Dr. B. S. Adams, of Hibbing, Vice President, presided. Interesting papers were presented by Dr. E. E. Kidder, of Hibbing, on "A Case of Barbital Poisoning," and by Dr. F. McK. Ruby, of Hibbing, on "Eye Injuries." These papers were discussed by Doctors Tuohy, Boyer, Sherer and others.

Dinner was served at seven o'clock, after which short addresses were made by Dr. S. H. Boyer, President-elect, and Dr. J. T. Christison, President of the State Association. Dr. E. L. Tuohy, President of the Society, presided at the dinner. Dancing followed.

LYON-LINCOLN COUNTY MEDICAL SOCIETY

The following officers were elected September third for the Lyon-Lincoln County Medical Society:

President, P. E. Hermanson, Hendricks; vice president, W. W. Yaeger, Ivanhoe; secretary-treasurer, H. M. Workman, Tracy; delegate to Minnesota State Medical Association, E. T. Sanderson, Minneota; alternate, A. L. Vadheim, Tyler; censor, B. C. Ford, Marshall.

It was voted to hold another Clinical Course of six lectures beginning Tuesday, October 1, 1929. Meetings are to be held at Marshall.

H. M. Workman, M.D.,
Secretary.

CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*
Minnesota State Medical Association
11 West Summit Avenue
Saint Paul, Minnesota

1. *Question.*—Which one of the children can give permission for an autopsy on their mother? The husband is deceased. Is it necessary to get the oldest son or daughter to make it legal?

   Answer.—We have not been able to find any ruling on the subject of permission for autopsies. Everyone has assumed that the body should be classed with the rest of the property. It becomes an estate as soon as the individual ceases to breathe. Under Probate Court rules, the nearest legal survivor has disposition of the property. The court informs us that they have never had the question of who has charge of the body come up. It seems safe to get the nearest legal survivor or survivors to sign the permission. If there is more than one child, all share equally and all should be asked permission for the examination, if this is possible. Sometimes, examinations are done with the consent of one child if he assures the physician that his brothers and sisters are agreeable. Permission from the parents of the deceased husband or wife is apparently not legal as the offspring are the nearest legal relatives. This point is being settled in the courts of another state at the present time.

2. *Question.*—I have a patient, 72 years old, who has hypertension. He injured his right foot two months ago. The traumatized tissues have never healed and are now showing gangrenous changes There is a fair amount of pain and swelling in the foot, but the patient is able to be up and about. What is the best treatment?

   Answer.—Your patient is probably suffering with arteriosclerotic gangrene. The urine should be carefully examined for sugar as a considerable number are associated with diabetes (diabetic gangrene). Before any treatment is prescribed, it is advisable to try for pulsation in the dorsalis pedis artery. *X*-ray examination of the legs will also give you some idea of the extent of the sclerosis of the vessels. In advanced sclerotic subjects, the vessels can be seen very plainly. In others, only an occasional bead may be distinguished. The circulation may also be tested with an oscillometer and with the rate of absorption of saline solution injected intradermally. Both legs should be tested in the same way. If there is a fair blood flow, expectant treatment may be tried. The patient should be kept in bed and the foot elevated. Dry heat is applied by putting a light in a wire basket and covering with a blanket. If the condition does not improve, amputation in the middle of the thigh should be considered.

3. *Question.*—A. B., male, aged 62, came to me not long ago complaining of pain in the jaw, ear, and side of the face. He has a firm, painful area between the side of the tongue and the pillar of the tonsillar fossa. This has been present for several months. I suspect malignancy. What is the best way to confirm my impression and what is the treatment?

   Answer.—Biopsy should be taken from the affected region in the tongue or the tonsillar pillar. A vertical slice of fair size should be taken. If local anesthesia is used, do not inject too near the tumor because of the danger of transplanting malignant cells. Very often, if a very sharp knife or razor blade is used, it is not necessary to use any anesthetic. If the condition proves to be a squamous carcinoma, probably the best form of treatment is local radiation with resection of the region which drains this part of the mouth. Radium is best used in the form of needles containing radium emanation which may be planted in the lesion. The dissection of the neck should include the glands, both salivary and lymphatic, and probably the muscles, superficial veins, and some of the nerves. The chances for cure in such lesions depend upon the ability to destroy the local growth and to prevent the spread to the surrounding parts. Very few malignant tumors in this region metastasize to distant parts of the body. Unfavorable results are usually due to inability to swallow, pain, toxemia, and aspiration of material into the lungs. Death usually occurs from cachexia or pneumonia.

4. *Question.*—What is the best method of making an early diagnosis of carcinoma of the stomach? Are there any pathognomonic signs of an early lesion?

   Answer.—In the absence of obstruction which produces vomiting and weight loss, there are no early signs or symptoms by which a lesion can be diagnosed without an *x*-ray examination. Many people in middle and late life come to a physician with a story of stomach trouble. There are so many things which can cause this that a physician is often in a quandary as to the best best method of handling the complaint. He does not want to order expensive *x*-ray studies unless there is a clear-cut indication. It would seem advisable if we wish to make a diagnosis of carcinoma of the stomach in the early stages to have some means of separating gastric complaint patients into groups. Perhaps a gastric expression with a careful search for free hydrochloric acid should be the dividing line. All patients who have gastric complaints which are not due to gall-bladder, heart, or other disease should have a gastric expression done. All showing absence of free hydrochloric acid should have an *x*-ray study made. This will not get all the suspects as a considerable number of carcinomas of the stomach show some acid. *X*-ray examination should include both a fluoroscopic and plate study. If positive for malignancy, an attempt should be made to find metastasis. Examination of the rectum for transplants in the cul-de-sac and the palpation of the left supraclavicular space for Virchow's node should be routine procedures. Biopsy of an enlarged node in this region is also helpful. Involvement of the liver is often suspected when jaundice is present.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

SURGERY

SUPERVISORS:

DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

END-RESULTS OF TRANSPLANTATION OF THE URETER: Charles Morgan McKenna, M.D. (Surg. Gynec. & Obstet., Vol. XLIX, No. 2, Aug., 1929, 174-180). The author in mentioning the literature review of this work lauds the work and perfection of a satisfactory technic of ureteral transplantation by Charles Mayo, Coffey, Lower, Franklin Martin, Styles, Fowler, and Peters. But at the same time he deplores the fact that the pathology, bacteriology, and kidney function studies on these cases have been neglected.

Cases to be benefitted by this operation are exstrophy of the bladder, and although surgeons have favored nonoperative measures for bladder cancers in the past he believes that in the future ureteral transplantation will become more popular in early cancer cases.

The author began a series of experiments in October, 1925, to study the end-results of ureteral transplantation with special reference to the kidney function, pathology, and bacteriology. Statistics were compiled and analyzed from operations performed on 14 dogs and 1 human being with the Coffey technic as the operation of choice.

The first few operations were failures due to a faulty step in the technic, that is—having too much tension on the ureter, and the dogs died a short time postoperatively because of a suppuration at the site of the implantation, with a resulting general peritonitis and acute pyelitis. After this fault was corrected good operative results were obtained and studies made over a one- to two-year period.

Only one ureter was transplanted in each dog, the other side being used for a control.

In one case the ureter was isolated, a longitudinal incision made and the abdomen closed without drainage in order to determine if a ureter would heal spontaneously. It did not heal and the animal died from a generalized infection involving the peritoneum, pleura, ureter, kidneys and bladder.

In several cases the transplants were made in the bladder and in each instance a hydro-ureter was found at autopsy due to a constriction at the site of anastomosis, proving that the bladder does not have the same valve-like mechanism as the bowel and that the latter is the operation of choice.

One year or more postoperatively the dogs were reoperated upon, function tests and urine cultures made, anesthetized and autopsied. The following findings were practically uniform in each case.

1. *Kidney function.*—The dye appearance time and concentration was the same on both sides and within normal limits.

2. *Urine cultures.*—Negative in all cases with one exception. In this case a bladder transplant had been performed and colon baccilus recovered.

3. *Pathology.*—

a. Kidneys. The operated side was the same size or slightly smaller than the control and with some scarring at the upper and lower poles.

b. Ureter and pelvis of normal size and the anastomosis well healed with some thickening.

The case report given on the human was one of the ureter transplant in the bladder because of a ureterovaginal fistula caused by trauma during a pelvic operation 6 months previous. The patient made an uneventful recovery, with splendid results.

AUTHOR'S CONCLUSION

The Coffey technic is the most suitable operation.

More attention should be paid with regard to kidney function, bacteriology, and pathology.

Ureteral transplants into the large bowel is the only satisfactory operation for exstrophy of the bladder and should be used more in early cases of cancer involving the bladder.

Avoidance of hydro-ureter should be more guarded against than ascending infections and that a suitable technic with reference to the muscularis and mucosa of the bowel will overcome this hazard.

L. C. THOMAS, M.D.

SURGERY OF THE ESOPHAGUS: James H. Saint, M.D. (Arch. of Surg., Vol. 19, No. 1, July, 1929, p. 53). The article furnishes a splendid review of the literature, giving the present status of more important surgical procedures on pathological conditions of the esophagus.

Factors which have hindered progress in this field have been manifold, the anatomy of this structure being not the least.

1. Inaccessibility.
2. It possesses no serous coat to react to traumatic irritation and in in healing.
3. The submucous and muscular coats cut easily with suture.
4. It has a relatively poor blood supply.
5. Post-operative injection.
6. Danger of shock from interference with vagi.
7. Presence of the diaphragm.

Most men are agreed that operations on the esopha-

gus by the posterior mediastinal route are best approached on the right for operations in the region of the hilum, and on the left for the lower thoracic portion of the esophagus. All lesions in the esophagus have a tendency to narrow the lumen.

1. In the lumen—Foreign bodies and tumors.
2. In the wall—Cardiospasm, congenital stricture or stricture from injury or inflammation.
3. Outside the wall—Tumors, diverticula, aneurysm, enlarged lymph nodes and abscesses.

A variety of esophagoplastic operations have been attempted, using parts or the whole of the stomach, the jejunum, the colon, etc., in the endeavor to get a tube lined by mucous membrane and preserve peristalsis. The author feels that provided gastrostomy proves inefficient and brings unbearable discomfort on the patient, then antethoracic esophagoplasty is justifiable with the risks understood by all concerned. Regular and systematic dilatation of impermeable esophageal stricture would reduce radical surgical procedures to a minimum.

Concerning carcinoma of the esophagus: Because of the anatomic relationships, the highly malignant nature (90 per cent on Broders classification being graded 3–4 on a basis of 4), frequent metastasis, danger of infection, mutilation and shock, surgical removal cannot be expected to give any degree of success.

Diverticula of the esophagus (so-called) have been definitely proved to be pharyngeal. Although the two-stage method is more popular, the one-stage still has its advocates. Summarizing: The two-stage operation can be done with so little risk that it has been adopted practically universally. Van den Wildenberg has introduced sacculopexy as the first stage in two-stage removal. Statistics show that though ideal from a technical standpoint, the one-stage method means unnecessary risk. Sacculopexy by its simplicity, absence of risk of sepsis and because of results already obtained seems likely to become more popular as time goes on.

Charles W. Mayo, M.D.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

ANILINE AND NITROBENZENE POISONING IN INFANTS. Mendel Zeligs, M.D., Cincinnati (Arch. of Ped., August, 1929, Volume XLVI, No. 8). The use of aniline and its derivatives in dyes and inks has become widespread in recent years. Reports of aniline dye poisoning in infants are quite rare, probably because young children do not wear dyed shoes, but the menace of diapers and clothing, freshly stamped with laundry ink containing nitrobenzene or aniline, has not sufficiently been emphasized. Rayner reports a sudden onset of marked cyanosis in 17 infants, the cause of which puzzled the London profession for some months, until it was finally traced to the freshly stamped diapers.

Ewer reported five infants, 16 days to 11 weeks old, poisoned by means of freshly stamped diapers. All developed cyanosis, but in two, who also had extensive furunculosis, and therefore absorbed more of the dye, there were symptoms of toxemia. These infants had shallow respiration and persistent vomiting. Drowsiness developed, then clonic convulsions which first involved one arm and then became generalized. All of the patients recovered.

The chief symptoms of the poisoning are probably due to the formation of methemoglobin in the blood and the diminution of available oxygen resulting in partial asphyxia of the tissues. The blood when drawn is a characteristic chocolate brown color. Young and his collaborators believe that the chocolate brown color of the blood is due to the para-amidophenol and not to methemoglobin.

It should be remembered that naphthalene, phenacetin, antifebrin, acetanilid and other coal tar derivatives in large doses, or taken for long periods, may also give a similar clinical picture.

The treatment consists in removing the dye-containing clothing and washing the skin with ether, if it is discolored. Inhalation of oxygen containing 5 per cent CO_2 is indicated, as this stimulates respiration and aids the restoration of hemoglobin.

The prognosis is good if the condition is discovered early and the dye is removed so that the dose absorbed is not too large.

R. N. Andrews, M.D.

PITUITARY LIQUID (SURGICAL) ARMOUR, PITUGLANDOL-ROCHE, PITUITARY EXTRACT-LEDERLE 20 UNITS, PITUITARY EXTRACT-LILLY (SURGICAL), PITUITARY EXTRACT SURGICAL-MERRILL, SOLUTION PITUITARY EXTRACT SURGICAL-MULFORD, PITUITRIN "S" (SURGICAL) AND PITUITARY SOLUTION SURGICAL-WILSON OMITTED FROM N. N. R.

The Council on Pharmacy and Chemistry reports that a reliable method of standardization for pituitary was made official in the tenth revision of the U. S. Pharmacopeia. While up to that time the Council had recognized solutions of pituitary of various strengths, when an exact standard had been made available, the Council decided that it was not in the interest of rational therapy to market strengths different from that of the pharmacopeial product. The Council therefore has omitted all pituitary solutions differing from the pharmacopeial strength from New and Non-official Remedies, 1929. (Jour. A. M. A., August 17, 1929, p. 524.)

EYE, EAR, NOSE AND THROAT

SUPERVISORS:
VIRGIL J. SCHWARTZ,
PHYS. & SURG. BLDG., MINNEAPOLIS
ARTHUR C. DEAN
CROOKSTON CLINIC, CROOKSTON

THE TREATMENT OF OTOSCLEROSIS. Sir Robert Woods. Jour. of Laryng. & Otol., 1929, 44, 372.

The degree of irritation aroused by an infecting organism determines the acuteness or chronicity of a pathologic process. This degree, further, depends upon the nature of the toxin excreted by the microbe and upon the irritability of the tissues of the host. Inflammation being a process which prevents the body from summary destruction, a cure is sometimes retarded or rendered wholly impossible because of insufficient inflammation. Artificial excitation, therefore, as with a cautery, reproduces in a fashion, a sharp, acute inflammation resulting often in the cure of a chronic condition. Other agents used for this purpose include innumerable chemicals, light, heat, cold, X-rays, and radium.

As is well known, bony ankylosis of the joint surrounding the footplate of the stapes constitutes the immediate cause of deafness in otosclerosis. The cause is unknown, but it is highly probable that a microörganism is responsible for this process. Assuming, therefore, that the condition is an infection, a 15 per cent dilution of tincture of iodine was employed as an intratympanic injection with the result that a lively, though not intolerable tympanic inflammation was produced. The apparatus used consists of a long straight needle into the end of which a smaller finer needle (as fine a gauge as procurable) has been soldered. The injection is made behind the malleus, and the desired amount of solution is injected from an ordinary medicine dropper which is inserted into the rubber-tubing attached to the large end of the needle. The drum vessels dilate and maximum pain develops in about one minute, after which there is slow subsidence for about fifteen minutes, when it quite disappears. The reaction lasts several days, and in about two weeks no sign of it or of the puncture remains.

The improvement in hearing in early cases has often been very great, but old cases receive little benefit or none at all. This applies, of course, to cases of unquestioned otosclerosis in which the onset is slow, the drum is normal, inflation produces no improvement, the Rinne test is negative (or a low positive) and the lower tone limit is raised.

More recently the tincture of iodine has been replaced by a one-tenth dilution of liquor iodi, B.P., the latter being more stable. Even so, solutions should be made fresh once a week. Injections must not be made more frequently than once in two weeks. Radium has also been employed for this purpose, using 8.5 to 10 milligrams of element in platinum containers of 0.5 mm. and 0.6 mm. thickness. Comparisons cannot as yet be made, but it would seem that in early cases iodine gives the better results, in old ones, radium. Early cases can best be recognized through loss of hearing for the lowest tuning-forks. No spectacular cures must be expected, but any improvement in so hopeless and intractable a condition should be welcomed. Such improvement as does not take place is usually permanent.

VIRGIL J. SCHWARTZ.

ACRIFLAVINE HYDROCHLORIDE AND ACRIFLAVINE BASE

When first used, acriflavine base was called "trypaflavine" by Ehrlich. In England and in this country, however, the hydrochloride is commonly known as acriflavine, although the free base (which has also the designation "neutral" acriflavine) sometimes goes under the same name. Because the standards for these dyes which had been adopted by the Council on Pharmacy and Chemistry in 1919 had been found inadequate and because some American authors had asserted that the foreign product was superior to the domestic, the American Medical Association Chemical Laboratory undertook an extensive investigation of the composition of the dyes. As a result of the comparison of the various European and American brands of acriflavine hydrochloride and acriflavine base it is concluded that there is not sufficient difference in the purity to justify the statement that the foreign product is superior to the domestic, even though at times the brands differ in appearance. The work of the Laboratory emphasized that a solution of acriflavine hydrochloride is distinctly acid in character. Even a solution of acriflavine base imparted an acid reaction in the range of a P_H from 3 to 5. Two years ago, after these investigations were started, the Council on Pharmacy and Chemistry adopted for New and Non-official Remedies the scientific name acriflavine hydrochloride, for the product generally known as acriflavine, and the scientific name acriflavine base for "neutral" acriflavine, and the completed work of the Laboratory emphasizes the importance of the adoption of these names by physicians in their prescriptions and their publications. (Jour. A. M. A., August 31, 1929, p. 695.)

REPORT MINNESOTA STATE BOARD OF MEDICAL EXAMINERS, JUNE, 1929

BY EXAMINATION

Name	School and Date of Graduation	Address
Abramson, Milton	Univ. of Minn., M.B., 1928; M.D., 1929	General Hospital, Minneapolis
Anderson, Herman Reynold	Univ. of Minn., M.B., 1929	2943 29th Ave. S., Minneapolis
Bergquist, Ehrling Lloyd	Univ. of Minn., M.B., 1929	3236 Pillsbury Ave., Minneapolis
Billings, Ralph Everett	Univ. of Minn., M.B., 1928	University Hospital, Minneapolis
Brady, John Philip	Univ. of Mich., M.D., 1925	U. S. N. Recruiting Station, Federal Bldg., Minneapolis
Brown, Milton G	U. of Minn., M.B., 1926; M.D., 1927	Brainerd Clinic, Brainerd, Minn.
Bunker, Paul Gordon	U. of Minn., M.B., 1928; M.D., 1929	Miller Hospital, St. Paul, Minn.
Burke, Charles Francis	Univ of Wis., M.D., 1927	Mayo Clinic, Rochester, Minn.
Burns, Leo Sylvester	Univ. of Minn., M.B., 1929	Graceville, Minnesota
Corr, William Philip	Rush, M.D., 1924	Mayo Clinic, Rochester, Minn.
Decker, John G	Univ. of Minn., M.B., 1929	Hackensack Hospital, Hackensack, New Jersey
Drill, Herman Ernst	Univ. of Minn., M.B., 1928	1400 Portland Av. S.,Minneapolis
Droegemueller, Edmund H	Rush, M.D., 1928	603 1st St. S.W.,Rochester, Minn.
Dukelow, Donald Arms	Univ. of Minn., M.B., 1929	Chas. T. Miller Hospital, St. Paul
Duncan, William	Univ. of Minn., M.B., 1928	General Hospital, Minneapolis
Dunnavan, Floyd Leighton	U. of Minn. M.B., 1928; M.D., 1929	4908 Sunnyside Av., Minneapolis
Dysterheft, Adolf F	Univ. of Minn., M.B., 1929	Glencoe, Minnesota
Erickson, Eskil	Univ. of Minn., M.B., 1929	603 Delaware St. S.E., Minneapolis
Fritsche, Carl J	Northwestern, M.B., 1929	New Ulm, Minnesota
Gemmell, John Henry	Univ. of Minn., M.B.; M.D., 1928	Brainerd, Minnesota
Gibbs, Edward Claude	Univ. of Minn., M.B., 1929	Miller Hospital, St. Paul, Minn.
Giere, Ellis Karl	Univ. of Minn., M.B., 1929	329 Union St. S.E., Minneapolis
Goldenberg, Julius L	Univ. of Minn., M.B., 1929	913 Ashland Ave., St. Paul, Minn.
Goldman, Theodore Isaac	U. of Minn., M.B., 1928; M.D., 1929	530 6th Ave. N., Minneapolis,
Greene, H. Harvey	Univ. of Minn., M.B., 1929	137 Robertson St., St. Paul, Minn.
Hanson, Ernest Oliver	Univ. of Minn., M.B., 1929	Franklin, Minnesota
Hauge, Malvin I	Univ. of Minn., M.B., 1929	2504 11th Ave. S., Minneapolis
Hilleboe, Herman E	Univ. of Minn., M.B., 1929	St. Andrew's Hosp., Minneapolis
Horwitz, Solomon Edward	Univ. of Minn., M.B., 1928	1201 Humboldt N., Minneapolis
Johnson, Richard Melvin	U. of Minn., M.B., 1928; M.D., 1929	2909 Franklin Terrace, Minneapolis, Minn.
Johnson, William E	U. of Minn., M.B., 1928; M.D., 1929	3718 Bryant Ave. S., Minneapolis
Jorgenson, Harvey Leslie	Univ. of Minn., M.B., 1929	901 E. River Road, Minneapolis
Keith, Haddow M	Univ. of Toronto, M.B., 1924	607 14th Ave. S.W., Rochester
Larson, Lester Eugene	Univ. of Minn., M.B., 1929	901 E. River Road, Minneapolis
Lufkin, Charles Dexter	U. of Minn., M.B., 1928; M.D., 1929	617 Goodrich Ave., St. Paul
McCarthy, Joseph Justin	St. Louis U. School of Med., M.D., 1928	4412 West Lake Harriet Blvd., Minneapolis, Minn.
Mattson, C. Henning	Univ. of Minn., M.B., 1929	844 Charles St., St. Paul, Minn.
Meade, John R	Univ. of Minn., M.B., 1929	1049 Goodrich Ave., St. Paul
Meyer, Alvin John	Univ. of Minn., M.B., 1929	901 E. River Road, Minneapolis
Michel, Henry H	Univ. of Minn., M.B., 1929	2303 30th Ave. S., Minneapolis
Miller, Samuel	U. of Minn., M.B.,1928; M.D., 1929	Medina, North Dakota
Mueller, Selma Christine	Univ. of Mich., M.D., 1927	Mayo Clinic, Rochester, Minn.
Nehring, Jesse Potter	Univ. of Minn., M.B., 1929	954 27th Ave. N.E., Minneapolis
Nordman, Willard Fred	Univ. of Minn., M.B., 1929	901 E. River Road, Minneapolis
Paradis, William G	U. of Minn., M.B., 1925; M.D., 1926	Sunnyrest Sanitarium, Crookston, Minnesota
Peck, Llewellyn R	Univ. of Minn., M.B., 1929	Hastings, Minnesota
Pennington, Reuben	Univ. of Minn., M.B., 1929	2831 Park Ave., Minneapolis
Peterson, Nordahl	Univ. of Minn., M.B., 1928	Swedish Hospital, Minneapolis
Peterson, Walter Lee	Univ. of Minn., M.B., 1929	3454 Penn Ave. N., Minneapolis
Quilling, Phillip A	Univ. of Minn., M.B., 1929	4504 Grimes Ave. S., Minneapolis
Rudie, Clifford N	Univ. of Louisville, M.D., 1928	Mazeppa, Minnesota
Seifert, Milton H	Univ. of Minn., M.B., 1929	Northern Pacific Hospital, St. Paul, Minn.
Sherwood, J. Vincent	U. of Minn., M.B., 1928; M.D., 1929	2117 Laurel Ave., Minneapolis
Skjold, Arthur C	Univ. of Minn., M.B., 1929	Miller Hospital, St. Paul, Minn.
Slocumb, Charles Henry	Univ. of Minn., M.B., 1928	Plainview, Minnesota
Smisek, Frank M	U. of Minn., M.B., 1928; M.D., 1929	1516 6th St. S.E., Minneapolis
Sorenson, Raymond	Northwestern, M.D., 1929	Stillwater, Minnesota
Spano, Joseph Paul	Univ. of Minn., M.B., 1929	647 Buchanan St. N.E., Minneapolis, Minn.
Thompson, Robert C	Univ. of Minn., M.B., 1929	Gorgas Hospital, Panama, Canal Zone
Thoreson, Merle O	Univ. of Minn., M.B., 1929	Ancker Hospital, St. Paul, Minn.

Tracy, Edward Joseph	Univ. of Minn., M.B., 1929	Fitzsimons General Hospital, Denver, Colorado
Trombley, Robert A	Univ. of Minn., M.B., 1929	St. Luke's Hospital, Duluth, Minnesota
Williams, Marland Reinhold	Univ. of Minn., M.B., 1929	Bethesda Hospital, St. Paul, Minn.
Wilson, James Valentine	Marquette, M.D., 1929	St. Joseph's Hospital, St. Paul

BY RECIPROCITY

Cummings, Damon Ward	Univ. of Louisville, M.D., 1928	c/o Dr. L.P. Mayer, Hudson, Wis.
Ericson, Reinhold Milton	Wash. Univ., M.D., 1928	2615 Newton Ave. S., Minneauolis
Ghrist, David Garrison	Harvard, M.D., 1925	Mayo Clinic, Rochester, Minn.
Sinamark, Andrew	Univ. of Nebraska, M.D., 1917	Hibbing, Minnesota

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

ABBOTT LABORATORIES

Abbott's Viosterol Cod Liver Oil

CIBA CO., INC.

Atoquinol-Ciba

Vioform-Ciba

ELI LILLY & CO.

Inhalant Ephedrine (Plain)-Lilly

Hypodermic Tablets Ephedrine Hydrochloride-Lilly, 0.016 Gm. (¼ grain)

Hypodermic Tablets Ephedrine Hydrochloride-Lilly, 0.0325 Gm. (½ grain)

Hypodermic Tablets Epedrine Sulphate-Lilly, 0.016 Gm. (¼ grain)

Hypodermic Tablets Ephedrine Sulphate-Lilly, 0.0325 Gm. (½ grain)

Lilly's Ephedrine Jelly

Ointment Ephedrine Compound

Syrup No. 110 Ephedrine Sulphate

Syrup No. 111 Ephedrine Sulphate

MEAD JOHNSON & CO.

Mead's Powdered Lactic Acid Milk, Non-Curdling No. 1 with Dextrose

TRUTH ABOUT MEDICINES

Inhalant Ephedrine (Plain)-Lilly.—A solution containing ephedrine-Lilly (New and Non-official Remedies, 1929, p. 166), 1 Gm.; cottonseed oil, 1 Gm.; perfumed and tinted, liquid petrolatum to make 100 c.c. Eli Lilly & Co., Indianapolis.

Hypodermic Tablets Ephedrine Hydrochloride-Lilly, 0.016 Gm. (¼ grain).—Each tablet contains ephedrine hydrochloride-Lilly (New and Non-official Remedies, 1929, p. 168), 0.016 Gm. Eli Lilly & Co., Indianapolis.

Hypodermic Tablets Ephedrine Hydrochloride-Lilly, 0.0325 Gm. (½ grain).—Each tablet contains ephedrine hydrochloride-Lilly (New and Non-official Remedies, 1929, p. 168), 0.0325 Gm. Eli Lilly & Co., Indianapolis.

Hypodermic Tablets Ephedrine Sulphate-Lilly, 0.016 Gm. (¼ grain).—Each tablet contains ephedrine sulphate-Lilly (New and Non-official Remedies, 1929, p. 169), 0.016 Gm. Eli Lilly & Co., Indianapolis.

Hypodermic Tablets Ephedrine Sulphate-Lilly, 0.0325 Gm. (½ grain).—Each tablet contains ephedrine sulphate-Lilly (New and Non-official Remedies, 1929, p. 169), 0.0325 Gm. Eli Lilly & Co., Indianapolis.

Syrup No. 110 Ephedrine Sulphate.—It contains ephedrine sulphate-Lilly (New and Non-official Remedies, 1929, p. 169), 0.22 Gm., in 100 c.c. (1 grain per fluidounce) and alcohol 12 per cent; flavored and tinted. Eli Lilly & Co., Indianapolis.

Syrup No. 111 Ephedrine Sulphate.—It contains ephedrine sulphate-Lilly (New and Non-official Remedies, 1929, p. 169), 0.44 Gm., in 100 c.c. (2 grains per fluidounce), alcohol, 12 per cent; flavored and tinted. Eli Lilly & Co., Indianapolis.

Neocinchophen-B. P. C.—A brand of neocinchophen-N. N. R. For a discussion of the actions, uses and dosage, see New and Non-official Remedies, 1929, p. 114. Benzol Products Co., Newark, N. J. (Jour. A. M. A., August 17, 1929, p. 524.)

Viosterol.—Investigators discovered that ergosterol, when subjected to ultraviolet radiation, develops an antirachitic (vitamin D) potency enormously greater than that of cod liver oil. For therapeutic use the ergosterol after irradiation is usually dissolved in a vegetable oil. The Council on Pharmacy and Chemistry has adopted the term viosterol to designate irradiated ergosterol, and viosterol in oil to designate a preparation containing this substance dissolved in oil. The Council has also provisionally adopted the qualifying phrases 100 D, 5 D, etc., to designate the vitamin D potency of the various preparations as multiples of the vitamin D potency of good cod liver oil. Viosterol is for use in prophylaxis and treatment of rickets and, experimentally, in other conditions arising from faulty calcium and phosphorus assimilation. It should be borne in mind that viosterol does not contain vitamin A and that harm from hypercalcemia may result from the use of too large doses.

Viosterol in Oil 100 D.—Viosterol dissolved in a vegetable oil and standardized to contain 1,333 rat units of vitamin D in each Gm., this strength being 100 times that of a potent cod liver oil used as a standard. The daily prophylactic dose for the average infant and child is 8 to 10 drops (0.1233 to 0.1666 c.c.: 2⅔ to 3⅓ minims). The marketed preparations are accompanied by a dropper designed to deliver 3 drops to the minim.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

OUTLINE OF PREVENTIVE MEDICINE. Prepared under the auspices of The Committee on Public Health Relations, New York Academy of Medicine. 20 contributors. Editorial Committee: Frederic E. Sondern, Charles Gordon Heyd, and E. H. L. Corwin. 398 pages. Price, $5.00. New York: Paul B. Hoeber, inc., 1929.

VARICOSE VEINS. H. O. McPheeters, M.D., F.A.C.S., Director of the Varicose Vein and Ulcer Clinic, Minneapolis General Hospital; Attending Physician, New Asbury and Fairview Hospitals; Associate Staff Northwestern Hospital, Minneapolis. 208 pages. Illus. Cloth, $3.50. Philadelphia: F. A. Davis Company, 1929.

THE PHYSIOLOGY OF LOVE. George M. Katsainos, M.D., Ph.D., Boston, Mass. 326 pages. Price $4.00. Privately printed, 1929.

Dr. Katsainos is a scholar, a Greek scholar, a scientist and a physician of the highest repute. His book bears evidence of this. He has written extensively before but some of his writings have been suppressed.

In this book the author reveals the physiology of love in a fashion that is, to say the least, remarkable. Thorough scientist as he is, he is also a psychologist, fashionist and the ultra type of the male. The third chapter, "How Man Loves," testifies to this. The first chapter, "Instinct," surpasses anything that the undersigned has read or heard of. His fifth chapter, "Moral Aspect of Eros," and the eighth chapter, "Eros a Matter of Will," are enlightening and at the same time revolting against some of our present day ideas.

On the whole this book lays a wonderful foundation for the physician, particularly, and others as well who are truly interested in humanity. Dr. Katsainos, as I understand him, endeavors to solve those problems for the physician on the relation of the sexes which baffle the average practitioner altogether too often.

Only a reading and re-reading of the book will give an adequate idea of its value.

C. M. ROAN.

RECENT GRADUATE, Minnesota, one year's internship, desires assistantship to general practice. Gentile. 26 years old. Unmarried. Prefer Northern Minnesota. Excellent recommendations. Address D-43, care MINNESOTA MEDICINE.

GOOD OPENING—For physician in Northern Minnesota; town of 700. Good farming community. Address D. J. Laurin, President Commercial Club, Littlefork, Minnesota.

WANTED—Physician to do laboratory work in payment for office rent. Will give two rooms and share in waiting room. Central location, Minneapolis. Please state school, year of graduation, interneship, and length of time in practice. Address D-41, care MINNESOTA MEDICINE.

WANTED—Salaried appointments for Class A Physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Aznoe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

WANTED—Young doctor to locate in established office, share reception room with dentist. Dentist has large practice. Fine opportunity for an up and going doctor. Write C. C. Gerber, Arcade and Case Streets, Saint Paul, Minn., or call Tower 7340.

FOR SALE—By owner, one Liebel-Flarsheim Diathermy, perfect condition and perfectly modern. Cost $385.00 with extras. Will sell to the first person offering reasonable price. Why buy a new one when this one is as good as new? Address D-42, care MINNESOTA MEDICINE.

WANTED—Young physician for sanatorium work. Write Dr. Arnold Anderson, Tuberculosis Division, State Board of Control, State Capitol, Saint Paul, Minnesota.

DENTIST WANTED—To take over well established practice recently vacated by dentist taking up institutional work in New York City. Town, 500, large territory; good office rooms—heat, light and running water. Rent reasonable. Nothing to buy. Give references. Address D-38, care MINNESOTA MEDICINE.

FOR RENT—Established neighborhood office for doctor and dentist. Good location for young physician. In center of district. Inquire 904 Rice Street, Saint Paul, Minn.

FOR SALE—Complete set of Murphy's Clinics in good condition. Make an offer. Address D-40, care MINNESOTA MEDICINE.

WANTED—By clinic in Minnesota town, doctor to become affiliated with group. Salary to start, later equal ownership. Address D-44, care MINNESOTA MEDICINE.

Minnesota State Medical Association

SIXTY-FIRST ANNUAL MEETING

May 13, 1929

MINNEAPOLIS, MINNESOTA

PROCEEDINGS OF THE HOUSE OF DELEGATES. FIRST MEETING—MONDAY AFTERNOON, May 13, 1929

The meeting of the House of Delegates of the Minnesota State Medical Association, held in the Blue Room of the Masonic Temple, St. Paul, Minnesota, convened at two-five o'clock, Dr. J. T. Christison, President of the Association, presiding.

PRESIDENT CHRISTISON: The meeting of the House of Delegates will come to order.

The Chair has appointed a Credentials Committee consisting of

Dr. E. S. Boleyn of Stillwater
Dr. F. H. Magney of Duluth
Dr. A. W. Adson of Rochester

who will report in a very few moments.

While we are waiting for the report of the Credentials Committee, we shall take up the acceptance of the minutes of the last meeting of the House of Delegates. Inasmuch as they have been printed and published, the Chair will entertain a motion for their acceptance as printed.

DR. W. A. JONES: (Minneapolis): I so move.

DR. H. M. WORKMAN (Tracy): I second the motion.

The motion was put to a vote and carried.

PRESIDENT CHRISTISON: Is the Credentials Committee ready to report?

DR. E. S. BOLEYN (Stillwater): There are forty-seven certified delegates present now.

PRESIDENT CHRISTISON: The first report this afternoon is that of the President of the Council, Dr. H. M. Workman of Tracy.

Dr. Workman read the report of the President of the Council.

MEETING OF THE COUNCIL

A meeting of the Council of the Minnesota State Medical Association was held on Monday morning, May 13, 1929, at 10:00 A. M. at the Masonic Temple.

The first quarterly report from MINNESOTA MEDICINE was read and approved.

Motion made by Dr. Coventry, seconded and carried, that both the pocket membership cards and the wall certificates be mailed to the members in the future.

Motion made by Dr. Coventry, seconded and carried, that a Committee of two be appointed to study the membership of the medical and associate medical members in the University and state institutions and report to the Council a plan and policy for the Minnesota State Medical Association and the local affiliated societies.

Motion made by Dr. Coventry, seconded and carried, that the activities of the Committee on Public Health Education in securing the services of Mr. F. Manley Brist, Investigating Attorney for the Minnesota State Board of Medical Examiners, to appear before the local societies, be approved.

Motion was made and seconded that the name of Dr. C. B. Wright be suggested as Delegate to the American Medical Association for two years beginning January 1, 1930, and that his name be presented to the House of Delegates for such election.

Motion made and seconded that the name of Dr. J. T. Christison be suggested as Alternate Delegate and that his name also be presented to the House of Delegates for election.

The Council discussed the reports of the various Committees and the resolutions and other business that had been mailed to the Delegates and decided not to make any recommendations as these are matters for the House of Delegates to decide.

The meeting adjourned.

H. M. WORKMAN, President.

PRESIDENT CHRISTISON: You have heard the report of the president of the Council. What is your pleasure?

DR. J. M. ARMSTRONG (St. Paul): I move the report be accepted as read.

The motion was regularly seconded, was put to a vote and carried.

PRESIDENT CHRISTISON: The next order is the report of the President. Dr. Workman said his report would be brief. Mine will be still more so.

I really have nothing to say. At the meeting last year, I did not have an opportunity to thank you gentlemen for giving me the highest office which is in your power to give to anyone, and to tell you of my deep and grateful appreciation.

I might have said at that time that no human being could do more than a certain definite amount of work for any given organization. Some of you know that I have been active in the affairs of this Association for a good many years, perhaps not quite as many as my good friend W. A. Jones, but at any rate I have endeavored to do my bit.

All I wish to say today is that you may judge of us as officers of your Society by the work we have done. If it meets with your approval, we are grateful. If you have any constructive criticism to offer, we shall listen to it patiently.

Again, I thank you for conferring upon me the office of President of the State Association.

The audience arose and applauded.

PRESIDENT CHRISTISON: The next report will be that of the Secretary, Dr. Meyerding.

Dr. E. A. Meyerding read the report of the Secretary.

REPORT OF THE SECRETARY

The rapid and intensive organization of the profession of medicine is reflected in Minnesota and has increased the work of the State Secretary's office. The activities of the various committees have increased as they are becoming more familiar with the problems. More committee meetings are being held, more demand for notices and reports to be compiled and furnished by this office is the result.

The Newspaper Service and other activities of the Public Health Education Committee; General Information; Booking of Speakers for Medical Societies; Meetings, Annual, and others; Consultation Bureau are some of the outstanding services that are requiring increased attention in the Secretary's office.

Comments have been made that the Secretary's office sends out numerous and unnecessary communications to the membership. The fact of the matter is that the Secretary's office sends out only one set of notices to the membership, those pertaining to the Annual Meeting, and this year there were two. In addition the Secretary's office has a bulletin that goes to the secretaries and presidents of the affiliated organizations, the officers of the State Association, and the chairmen of the Committees; at the time of the Annual Meeting the members of the House of Delegates are included.

The notices that you receive are reports and contain information that the various Committees feel that you should have. It may seem that we are sending out a lot of letters, but we are constantly called upon for information as to the activities of the Association, and it is surprising how many read these communications.

The Secretary visited 17 societies and addressed 35 formal meetings of smaller medical groups in the state and had innumerable conferences with smaller groups of men. Scarcely a day passes, including holidays, that the State Secretary is not requested to attend one or more meetings or conferences that relate to the business of the Minnesota State Medical Association.

SOCIETIES VISITED

Blue Earth County Medical Society
Blue Earth Valley Medical Society
Camp Release District Medical Society
Central Minnesota Medical Society
Chisago-Pine County Medical Society
Hennepin County Medical Society
Houston-Fillmore County Medical Society
McLeod County Medical Society
Mower County Medical Society
Red River Valley Medical Society
Redwood-Brown County Medical Society
St. Louis County Medical Society
Stearns-Benton County Medical Society
Steele County Medical Society
Washington County Medical Society
West Central Minnesota Medical Society
Wright County Medical Society

GROUP MEETINGS

The Secretary was also present at the following meetings:

Fergus Falls—Northern Minnesota Medical Meeting.
Rochester—Southern Minnesota Medical Meeting.
Chicago—Secretaries Conference, American Medical Association.
Worthington—T. B. Short Course at the Southwestern Sanatorium.
St. Paul—Monthly meetings of the Committee on Public Health Education.
St. Paul—Regular meetings of the Committee on Scientific Assembly.
Minneapolis—Meetings of the State Health Relations Committee.
Minneapolis—Meetings of the Committee on Hospitals and Medical Education.
Duluth—Conference with the officers of the Women's Auxiliary.
Duluth—Conference with the Committee Members, etc.
Minneapolis—Meeting of the Radio Committee.
St. Paul—Small group meetings.
Rochester—Council Meeting.
Minneapolis—Meeting of the Clinicians of the Minnesota Public Health Assn.
Dawson—Conference with Chairman of Legislative Committee.
Tracy—Conference with President of Council.
Chicago—Meeting of American Public Health Association.
Chicago—To confer with American Medical Association re Minneapolis meeting.
St. Paul—Regional Conference.
Minneapolis—State Secretaries luncheons.
Minneapolis—Executive Board of Women's Auxiliary.
Minneapolis—Lymanhurst Institute.
Rochester—Regular meeting of the Mayo Clinic.
Minneapolis—Conferences with President of Association.

MEMBERSHIP BY SOCIETIES

	Dec. 31, 1928	April 23, 1929	Affiliate	Associate	Total
Blue Earth County	31	30	2		32
Blue Earth Valley	20	22	5		27
Camp Release Dist.	45	43	1		44
Central Minn. Dist.	16	13			13
Chisago-Pine County	16	14			14
Clay-Becker County	19	17	1		18
Dodge County	8	5			5
Freeborn County	20	17			17
Goodhue County	14	14			14
Hennepin County	502	488	21	7	516
Houston-Fillmore Co.	20	19	1		20
Kandiyohi-Swift Co.	21	19			19
Lyon-Lincoln Co.	19	17	1		18
McLeod County	16	13			13
Meeker County	8	8			8
Mower County	23	22			22

Nicollet-LeSueur	16	16			16
Olmsted County	282	306			306
Park Region County	39	38			38
Ramsey County	310	295	14		309
Red River Valley	57	54			54
Redwood-Brown Co.	33	30	2		32
Rice County	30	30	1		31
St. Louis County	185	175	4		179
Scott-Carver Co.	19	22	1		23
Southwestern Minn.	57	47			47
Stearns-Benton Co.	43	36	4		40
Steele County	12	10			10
Upper Mississippi	75	63			63
Wabasha County	10	11	2		13
Waseca County	9	11			11
Washington County	14	13			13
Watonwan County	6	7			7
West Central Minn.	23	22			22
Winona County	22	22			22
Wright County	16	16			16
	2,056	1,986	60	7	2,053

ATTORNEYS' REPORT

April 27, 1929.

Minnesota State Medical Association,
11 West Summit Avenue,
St. Paul, Minnesota.

Gentlemen:

Attention: Dr. E. A. Meyerding

Pursuant to your request of April 15 for report to date of cases commenced, ending or disposed of during the year 1928, we submit the following:

Schoenbachler vs. Anderson

Caroline Schoenbachler vs. Dr. R. E. Anderson of Willmar, Minnesota.

Action commenced in Kandiyohi County, Minnesota, in October, 1925. Alleged negligence in lancing boil or abscess, thereby causing permanent injury to arm. $20,000 damages sought. New Ulm attorneys brought this action but never brought it on for trial. In the latter part of 1927, attorney Ossana of Minneapolis was substituted as attorney for plaintiff. He sought to amend the complaint by including allegations of *x*-ray treatments given by Dr. Anderson, alleging that the same caused an open running sore on top of shoulder, which it was claimed caused the permanent injury rather than the abscess under the arm, described in the first complaint. This open sore on the shoulder of the plaintiff is, of course, what caused her disability rather than the abscess or boil described in the first complaint. This condition of the shoulder, however, existed before Dr. Anderson ever treated the woman, and, in fact, the woman came to him for treatment of this condition, and the lancing of the abscess in the region under the arm was incidental.

The fact also is that Dr. Anderson did not give this woman *x*-ray treatments.

We objected to the amendment and the matter was heard by the Court at Willmar in February, 1927, and the motion to amend was denied.

Subsequently, the plaintiff obtained still other attorneys, H. A. Burgeson and Mason W. Spicer. The case was set for trial at the March, 1929, term of court at Willmar. About the last of December, attorney Burgeson died. Thereafter, his partner, Mr. Spicer, wanted to know if we would settle the case. We refused. He then advised us that he did not intend to try the case. We requested him to please immediately advise his client, as we were going to insist upon this case being tried or dismissed at the March, 1929, term. He did so advise his client. She failed to secure other counsel; and upon our motion, when the case was called for trial, the case was dismissed for want of prosecution. The Statute of Limitations having now run, the case cannot be commenced over and is finally disposed of.

Anderson vs. Ulrich

Anna Anderson vs. Dr. Henry L. Ulrich of Minneapolis. There is nothing new to report since our last report of June 4, 1928.

Gray vs. Griber

Action brought by Dr. F. D. Gray of Minneapolis, Minnesota, through attorney W. E. Kempton, against George Griger, on account of services rendered on behalf of Mrs. Griger, now deceased. Counterclaim for damages interposed by defendant.

This case was never brought on for trial. We have advised Mr. Kempton to bring the case on for trial because a dismissal of the counterclaim must necessarily be granted, because it is a claim for damages on account of death by wrongful act made by the defendant as an individual, whereas only an executor or administrator of the estate of the deceased person can maintain such an action. The Statute of Limitations has now run against the bringing of such an action by an executor or administrator.

Halter v. Browning

Mrs. Dora Halter vs. Dr. William E. Browning, of Caledonia, Minnesota.

There is nothing new to report in this case since our report of June 4, 1928, except that Dr. Browning does not answer our letters. If consistent, we wish you would urge him to do so, as this case can likely be disposed of by agreement upon his part not to attempt enforcement of his bill. From our information, it appears so doubtful that he could collect his bill, even if he obtained a judgement against the plaintiff. It would appear to be advisable to drop the bill and thereby secure a dismissal of the case.

Hunt vs. Reihs

Nothing has developed in this case since our last report.

Trusting the foregoing serves your purpose, we are

Very truly yours,

OPPENHEIMER, DICKSON, HODGSON, BROWN & DONNELLY
by (Signed) Stan D. Donnelly.

SECRETARIES CONFERENCE

On February 23 the Annual Conference of Secretaries was held in St. Paul. Twenty-five societies of the total thirty-six societies were represented with the Council and officers of the State Association and other members being present. The Northwest Regional

Conference met at the same time as did also some of your committees. The session commenced on Saturday morning at nine o'clock and continued until midnight and part of Sunday. There were several sessions. Dr. W. A. Woodward of the American Medical Association attended.

The program thus created considerable interest among those present as reports from their local societies would indicate. We believe this to be the most successful Secretaries' Conference we have had.

It is the opinion of your officers and those who are attending these meetings that the Secretaries' Conferences are becoming of more importance every year and are probably the most valuable means that is known of creating coöperation between the State Association and its affiliated societies.

Dr. W. A. Woodward of the American Medical Association invited the Secretaries' Conference to meet at the headquarters of the American Medical Association at Chicago. He stated that Wisconsin, Michigan, and other states had already held such meetings and the Board of Trustees of the American Medical Association is anxious to have these meetings.

WOMEN'S AUXILIARY

From reports received, the Women's Auxiliary has increased in affiliated organizations and in the number of its members. The Secretary's office has coöperated with them in many ways, especially in arranging their Annual Meeting.

TUBERCULOSIS POST GRADUATE COURSES AT STATE INSTITUTIONS

With the coöperation of the Minnesota Public Health Association and certain of the State Tuberculosis Sanatoria, with the Committee on Hospitals and Medical Education, a Post Graduate Course on Tuberculosis has been put on, without any expense whatever to the members of the State Association, except the traveling expenses to and from the Course. The arrangements and expenses of the clinical staff were borne by the Minnesota Public Health Association, and the State and County Institutions assisted in putting on the program and entertaining.

Four Post Graduate Courses of one-day each have been put on, with a total attendance of 127, or an average attendance for each day of 31.75.

We feel that this method of placing before the profession Post Gradute work is probably the most satisfactory one known.

DIPHTHERIA IMMUNIZATION CAMPAIGN

A Conference was held of the Committee on Hospitals and Medical Education, with the Minnesota Public Health Association and the Minnesota Department of Health to discuss plans for a diphtheria immunization campaign. It was decided that the medical profession should be reached first, and then an educational program for the public should be put on. We understand that the State Board of Health has issued an order to have published suitable posters for doctors' offices showing the advisability of immunization against diphtheria in very young children by the family physician. Plans for a campaign by pediatricians to form a speakers bureau were made, but due to the influenza epidemic they did not materialize. We expect that further developments in this campaign will come about in the near future.

RESIGNATION OF THE TREASURER

The resignation of the treasurer, Dr. Earle R. Hare, was accepted at the meeting of the Council on February 23, 1929. Dr. A. G. Schulze, St. Paul, was appointed treasurer pro tem to fill the vacancy thus created until the meeting of the House of Delegates at which time a treasurer will be elected to fill Dr. Hare's unexpired term as well as one for the year 1930.

CONSULTATION BUREAU

The manner in which the Consultation Bureau was received, indicated that it fills a long felt want. For a time several letters were received each day. We feel that it is a very valuable and important part of the work of the Minnesota State Medical Association.

ANOTHER FULFILLMENT OF THE LEGISLATIVE PROGRAM

One of the outstanding results is the work that is being accomplished by Mr. F. Manley Brist, attorney for the Minnesota State Board of Medical Examiners. As is generally known, the passage of the Basic Science Law and the Medical Practice Act with the Registration feature made it possible for the State Board to employ an attorney to act as an investigator of illegal practice. The surprising results that have come from Mr. Brist's work makes everyone appreciate the value of such legislation. Full responsibility belongs to the State Medical Association, and the selection of the Board members is made through your Council, as through its efforts the State Board has acquired the legal status to carry on. The Secretary's office has arranged to handle the bookings of Mr. Brist's talks with the local medical societies.

SUMMARY

It is difficult to realize the increase in the amount of work that the activities of the State Association have taken, until one is associated with the secretary's office. In a short time additional office space and clerical services will be required.

CONCLUSION

Medicine costs the people in the United States about seven hundred million dollars per year. This means that more than $18,000,000 is spent annually in the state of Minnesota for medical care, and probably much more, considering the fact that there are several large medical centers in this state that draw from beyond our state boundaries. Keeping in mind that this is a business of considerable size, it is not only necessary that those who conduct this business keep up with the trend of the times, but that they be a step ahead.

The practice of medicine is apparently the business of organized medicine. Taking this view, your officers have appointed committees to study important

problems. These problems are so many and so varied that it would be impossible for any one group to keep posted on all phases and it is only by having the right kind of committee men that organized medicine can hope to make any progress in influencing the situation. Probably the most effective committee is the Legislative Committee. We believe that this committee is just beginning to function. Several other committees are functioning in the most admirable manner and are beginning to understand their problems. They are the Committee on Public Health Education, the Committee on State Health Relations, the Committee on Hospitals and Medical Education, the Committee on Contract Practice, the Heart Committee, Historical Committee.

E. A. Meyerding, Secretary.

Upon motion duly seconded and carried the report was accepted.

President Christison: The next report is that of the Treasurer.

Dr. A. G. Schulze read the Treasurer's report.

REPORT OF THE TREASURER

For the Year Ending December 31, 1928

RECEIPTS

Balance on hand Jan. 1, 1928—Minnesota Transfer State Bank	$ 211.89
First Minneapolis Trust Co.	1,290.09
Subscriptions Minnesota Medicine	9.00
Dues from members 1927, etc.	420.00
Dues from members 1928	30,559.00
Interest on bank balances	360.20
Miscellaneous	59.69
Checks outstanding Dec. 31, 1928	2,490.29
	$35,400.16

DISBURSEMENTS

Minnesota Medicine	$ 5,009.00
Legal Expense	85.00
Annual Meeting	1,178.52
Council	296.72
Salaries	4,210.48
Educational	2,231.77
Public Health Education Committee	3,573.77
Rent, Telephone, Telegraph, Sec. Conf., Sec. Trav. Exp.	1,294.64
Trust Fund	9,000.00
Miscellaneous	2,426.90
Cash on hand—Dec. 31, 1928, First Minneapolis Trust Co.	6,018.36
Checks outstanding—Dec. 31, 1927	75.00
	$35,400.16

Respectfully submitted,
Earle R. Hare, Treasurer.

Dr. A. G. Schulze (St. Paul): When this work was given over to me on the first of March, there was handed over to me $27,804.74. We have left in the Treasury at the present moment $17,616. The report is signed by Dr. Hare.

President Christison: Gentlemen, you have heard the report of the Treasurer. What will you do with it?

Dr. J. M. Armstrong (St. Paul): Shouldn't this be referred to an Auditing Committee, or something of that kind? I move it be referred to an Auditing Committee.

President Christison: Refer it to the Finance Committee, if you choose.

Dr. Armstrong: I think that ought to be the proper procedure. If I were the Treasurer, I should want it referred to the Finance Committee. I move that it be referred to the Finance Committee.

Dr. H. M. Workman (Tracy): The Finance Committee has had the report and audited it.

Dr. Armstrong: That is all right. I didn't know that. I don't think the rest of them knew it either. I withdraw my motion.

President Christison: This has already been taken cognizance of, and the report has been in the hands of the Finance Committee. We shall refer it anywhere you say. What is your pleasure with respect to this report?

Dr. W. A. Jones (Minneapolis): I move its acceptance.

The motion was regularly seconded, was put to a vote and carried.

President Christison: The next report is that of the Committee on Public Health Education, Dr. George Earl.

Dr. Earl read the report of the Committee on Public Health Education.

REPORT OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

1928

From the Constitution of the Minnesota State Medical Association:

"The Committee on Public Health Education shall consist of 5 members or as many more as the Council may determine. Its function shall be, first, to strive to develop an intelligent public viewpoint toward the medical profession; second, to coöperate with the various agencies throughout the state whose function is the promotion of public health, and whose governing bodies are composed in whole or in part of laymen, so that from a medical standpoint these agencies shall be intelligently administered; third, to use such measures throughout the State as may be necessary to eliminate fraudulent medical advertisements from the public press; fourth, to aid and encourage each component society to conduct at least one annual public medical meeting; fifth, to encourage public health educational matters through the channels of the public press—radio —movies and the lecture platform."

We have continued to send *Hygeia* and the *Northwestern Health Journal* to the members of the Legislature, adding to the list those representatives who were elected this year and who expressed their desire to receive these publications. It is essential that those who make our laws should be informed in matters of health.

Our newspaper service is meeting with much success. We now have two hundred forty-four rural papers on our mailing list. Through coöperation with the State Medical Society of Wisconsin, we are able to secure their Service at a minimum cost. Many letters from newspaper men and the laity have been received commending this service. Some adverse criticism has been received from those who feel that the doctors should pay for advertising.

A page each month in Minnesota Medicine has been assigned to the Committee. The intention of this page is to serve as a forum and the Committee will welcome any suggestions or articles that would seem advisable to reprint on this page.

The small group meeting has been continued and one hundred sixty-five men were interviewed through meetings with various Hospital Staffs in the Twin Cities.

Plans for a speakers bureau and speakers library are well under way and on several occasions we have sent material to various men throughout the state. It is our aim during the coming year to develop the Speakers Bureau and at the present time a survey is being made of other states' activities in this line. The presenting to the public of our problems by method of public speaking has created outstanding interest in the profession. One or more courses in public speaking have been held in St. Paul and Minneapolis, and a six weeks course in Duluth. A large number of medical men are appearing at noon programs giving talks of various lengths in these three communities. In Duluth, in one week, approximately sixty talks were given by the local medical society. It is important that we qualify ourselves to be ready to appear before any kind of group to discuss any given scientific problem as well as economic problems.

Through this Committee, the services of Mr. F. Manley Brist, Investigating Attorney for the Minnesota State Board of Medical Examiners, were made possible to the county societies. Thus far he has appeared before the following societies: Wright County Medical Society, Park Region Medical Society, Steele County Medical Society, Red River Valley Medical Society, Freeborn County Medical Society, Rice County Medical Society, Washington County Medical Society, Upper Mississippi Medical Society and the St. Louis County Medical Society.

The personnel of the Committee has been increased to ten members, giving this Committee representation from various parts of the State.

We have coöperated with the Radio Committee in financing the radio talks.

We are enclosing a supplementary report showing the type of problems that are coming to the attention of the Committee along the question of public health and public relations.

Many states have a Council of Health to correlate all the various health activities. The State Committee has given considerable thought to this problem and will continue this study during the coming year.

Much thought at the present time is being given to the cost of medical service. There is need that the public approach this question realizing its importance from the economic standpoint as there is a danger of weakening the whole moral fiber if people are to have the habit of receiving attention for nothing. In addition to this danger, such services are usually not the best that is possible to procure.

The Committee hopes during the coming year to develop a study of certain principles which we expect to publish in booklet form: We must see that the profession renders adequate medical service to the public; that a positive Health Program is carried on; that the youth is informed on health questions through proper curricula in the schools by our having representation on the school boards. We should have representation on the boards of lay organizations dealing with questions of health, and should take an active interest in governmental boards, such as deal with state medicine.

In our relations with the public, the following factors enter: The place of the individual doctor, the place of the Hospital Staff, or the local group of doctors, and the place of the county and district society. In carrying out our plans we must always remember that it is our duty to lead the public in the right path in regard to health and disease.

Respectfully submitted,
H. B. Bailey, M.D.,
R. O. Beard, M.D.,
B. J. Branton, M.D.,
Henry W. Cook, M.D.,
C. O. Estrem, M.D.,
H. F. Helmholz, M.D.,
M. O. Henry, M.D.
John A. McIntyre, M.D.,
F. H. Magney, M.D.,
F. H. Neher, M.D.,
George Earl, M.D.

The following resolution was then submitted by the Committee through Dr. Earl:

RESOLUTION

We, the members of the Minnesota State Medical Association, go on record endorsing the resolution passed by the Hennepin County Medical Society, on February 4, 1929, condemning the pernicious propaganda against the consumption of white flour. Said resolution also studied and endorsed by the Public Health Education Committee of the Minnesota State Medical Association.

We deplore that this propaganda, which is not based on scientific facts, has resulted in greatly reducing the consumption of white flour, and has been used in a dangerous way by the quack and the food faddist.

We desire, in the interest of public health to place this on record as our opinion.

The allegation that white flour is responsible for certain grave illnesses is not supported by scientific facts.

Minnesota State Medical Association,
President *(signed) J. T. Christison*
Secretary *(signed) E. A. Meyerding.*

Adopted at St. Paul, Minn., this 13th day of May, 1929.

Dr. C. B. Wright (Minneapolis): As you know, three years ago the House of Delegates had a Refer-

ence Committee to which all these reports were referred and gone over before they were presented.

Last night the Committee spent up to one o'clock reading and going over these reports. We should like to make comments where necessary, and bring before the House of Delegates anything which we consider should be taken up in these reports.

We read this report of Dr. Earl's very carefully, and it is a report we should like to recommend. Dr. Earl's committee has spent a lot of work on this report, and we feel the Committee should be commended for the amount of work they have spent on this rather indefinite field, in which there is more or less controversy.

With regard to this white flour recommendation, it is our opinion that it should be recommended for passage. I think the Council passed on that this morning, in addition to the Reference Committee.

SECRETARY MEYERDING: No, they left it to you.

DR. WRIGHT: Mr. Corson, who represents the milling industry, appeared before the Hennepin County Society last winter and presented his case so conclusively that the Hennepin County Society endorsed this action and drew up this resolution to be presented to the State Medical Association. We reviewed this at great length last night. There was considerable controversy. When it was all done, we agreed this was a worthy thing, and that we should put our stamp of approval on it.

Mr. Corson is here and, with the permission of the House of Delegates, I think it might be a matter of interest to grant him ten minutes that he may state his point of view on this matter.

DR. GEORGE EARL (St. Paul): Our Committee also endorses his being here to make a statement. He is not here just at the request of the Hennepin County Society, but he is here at the request of the Committee to present the case before the House of Delegates.

PRESIDENT CHRISTISON: If there is no objection, I should be very pleased to have Mr. Corson devote a few minutes to the elucidation of this particular subject. Hearing no objection, will you proceed, Mr. Corson?

MR. CORSON: Mr. President and Doctors: I want to say that I am glad to be here this afternoon to state our case.

I want to acquaint you with the work of the National Food Bureau, an organization of the milling and baking industry which has been organized primarily to disseminate food facts and overcome some of the insidious propaganda derogatory to white flour. In this day and age no business or profession can live a healthy life and prosper as it should without some kind of an organization to look after its best interest which affects that trade or profession. Any business or profession which progresses and grows becomes the target of the charlatan and the quack, your profession as well as that of the industry which I represent.

You will remember that during the World War we had a conservation program. Carbohydrates were needed. Our soldiers and allies needed carbohydrates, so the greatest advertising campaign the world has ever known was staged to save flour and sugar. This campaign, hooked up with the patriotic spirit, worked a miracle. Our wheat crop was short that year and we only had a visible, exportable amount of 21,000,000 bushels of wheat. So intense was this campaign, hooked up with the patriotic spirit, that we actually exported 141,000,000 bushels of wheat.

We have a class who are always trying to get rich at the expense of people's ills, real or imaginary, and some of the brightest minds of the country are engaged in this business. It is a well-known principle of psychology that you must first make people dissatisfied with that to which they have been accustomed before you can sell them something new. So in order to introduce new methods of cures, new cults and new issues, people must be made dissatisfied with that to which they are accustomed. In order that your profession may sell high priced patented foods, and so forth, that food which is most common is attacked—in this case, white flour. The result of that adverse situation has been the introduction of a wave of faddism, and the conversion of hundreds of thousands of otherwise sane people to the belief that white flour is injurious, resulting in so-called health doctors, who are waxing fat on the proceeds of pay from the misinformed public.

This condition has been one of the contributing factors to the reduction of the consumption of wheat in the United States. In the last five years the white consumption has decreased one bushel per person or, in other words, 120,000,000 bushels of wheat less than was used five years ago.

To show you how this condition is brought about, I want to give you a few specific illustrations. We maintain a research bureau and work very close to the American Medical Association. We have in our files in Chicago something like 227 of these quacks of different cults and different schools that are going around lambasting the medical profession and denouncing white flour and, in some cases, denouncing meat. Here is a hand bill of a man who went around the country lecturing. He advertises himself as a lecturer. He charges ten dollars, but his first lecture is free. Then he gets classes wherein he expects to sell his lectures for one or ten dollars. He has a book to sell. He urges the people to buy the Health Messenger. He has a question and answer page which also has a catch in it. All questions will be answered in the order received, but if immediate attention is desired two dollars must be enclosed. If a person is ill and wants an immediate answer, he is going to send the two dollars.

Here is a question: I drink a glass of hot lemonade before going to bed. Is this all right?

Here is the scientific answer: The hot lemonade is quite all right for you. If you find your eyes are lined with many white lines it would be best to drink a hot orangeade instead. Two dollars for that.

Here is one more: Last winter I found when sleeping on a sleeping porch I would feel a chill. What would you advise?

The answer: If sleeping outdoors chills you, the best thing to do is sleep indoors. (Laughter.) Two dollars.

Here is another one up in your country in 1927. We stopped this man in Oklahoma City. His name is Richardson, occultist, teacher, and everything else under the sun. He is an osteopath. He says white flour isn't fit to be eaten; neither are meat and potatoes. He has wonderful letters of recommendation. He was in Minneapolis in July 1927, and this is a letter he received from a woman who heard his lecture: "Due to an inferiority complex, I suffered thirty years of unhappy married life. May God bless you. I now enjoy my husband, home, and health as I have found I am as good as he is, and possibly a little better." (Laughter.)

I have a long report here from the American Medical Association concerning this Dr. Richardson, but I am not going to take your time.

I recently listened to a doctor broadcasting over the radio. He lambasted the medical profession. He is an M.D. In his talk he said, "I want to appeal to my listeners-in to help me out in getting my bill passed through the legislature of Illinois." I got busy and called up the American Medical Association. I went to Springfield and met Dr. Neal, the chairman of the Legislative Committee. I found Dr. Richardson had a bill introduced in the legislature: "The Science of Health versus Allopathic Medicine—the world's greatest humbug."

Gentlemen, he has money. He maintains a lobby of eight people. Dr. Neal said, "Mr. Corson, we are glad to have you help us. We are fighting twenty-one bills in the Illinois Legislature." The day the Judiciary Committee met Dr. Richardson had thirty-one people there, whose expenses he had paid, to tell what a wonderful school he had. He lambasts different institutions. To make a long story short, we did all we could to help the Illinois State Medical Society defeat this legislation. A wire from Dr. Neal has been forwarded to me from my office stating that the bill was defeated. It only received thirty votes out of the necessary seventy-seven. What will happen? It will be back in two years, and you may have to fight it in your community.

Hurriedly, that is the line of work we are trying to do. We realize it is the quack that is hurting our business. We have so many things in common, that I am only too glad to have this opportunity to appear before you and congratulate you on the wonderful organization which you now have and have had for some time looking out for your interests as a whole, and I only hope we may be able to build up such an organization as yours.

I further believe that if the milling and baking industry had functioned as an organization for the past twenty years you wouldn't need any farm relief today, as far as the wheat farm is concerned. No business or profession can operate satisfactorily today without some strong central organization to watch its collective affairs. Eternal vigilance is the price of victory.

I am here today representing a belated organization not yet six months old, to ask your assistance in disseminating food facts, and in fighting these quacks.

I thank you. (Applause.)

Dr. Earl: The officers have another matter which they felt should have been presented by our Committee, and which I believe has been taken up by the Reference Committee, and probably by the Council. We were asked to present that as a supplemental report.

This is a circular letter of the American National Red Cross. The following is a copy of Dr. DeKleine's letter:

INTER-OFFICE LETTER

American National Red Cross
Midwestern Branch, St. Louis.
February 27, 1929.

To Miss Norma Eskil
From Mrs. Elizabeth H. Vaughan

The following is a copy of Dr. William DeKleine's letter of February 18 to Miss Fox:

The Red Cross NURSING SERVICE HAS functioned for several years under the general policy:—"The nursing of patients shall be carried on only under the DIRECTION of a LICENSED PHYSICIAN."

A NEW PHASE OF THIS QUESTION has, however, been introduced in recent years which has NECESSITATED BROADENING this policy, or making it MORE ELASTIC in its application. Certain states have passed laws LICENSING OSTEOPATHS AND CHIROPRACTORS. The public occasionally requests nursing service for patients who employ these practitioners.

Where nurses are employed through local funds raised either through taxation or voluntary subscription, and where these practitioners are licensed by law, THE NURSES HAVE A MORAL AS WELL AS A LEGAL OBLIGATION. THEY CANNOT IN GOOD GRACE REFUSE TO ASSIST SUCH PATIENTS WHO REQUIRE THEIR SERVICES.

It has, therefore, been necessary to broaden this general policy. In states that have adopted laws regulating the practice of OSTEOPATHS AND CHIROPRACTORS, NURSES ARE PERMITTED TO ASSIST only those who are duly licensed, provided that the nursing service shall be absolutely limited to the type of work for which OSTEOPATHS and CHIROPRACTORS are licensed. Nurses are not permitted, for example, to assist them in giving hypodermics, or in any operation or procedure which osteopaths and chiropractors are not permitted to do legally.

Dr. Earl: I wish to submit this as a supplemental report. Our Committee wishes to leave it to the Reference Committee for any recommendations.

Dr. Wright: We spent considerable time on this letter. I had seen the letter some time before, and had gone over it very carefully. This is a very insidious type of propaganda. For two or three years the Visiting Nurses' Association of Minneapolis, which is maintained and supported by the Community Fund, has been persecuted to permit the nurses to work for these cults, and some of the

most prominent men in Minneapolis have backed them in their position.

The Advisory Medical Committee took the stand that no good could be accomplished by asking highly trained public health nurses to nurse for men whose method of treatment is limited in scope and not in any way familiar to the nurses who are going to carry out their instructions.

In order to get the thing before us, I told them to invite a representative from the osteopathic and chiropractic associations to meet with us and explain just what they wanted nurses for. In that discussion we asked them what they wanted nurses for. They said, "We occasionally have heart cases."

I said, "You take complete charge of heart cases?"

"Yes."

"Do you believe in the use of digitalis in the treatment of heart disease?"

"Yes." They thought that was a good thing.

"Do you prescribe it yourself?"

They said they didn't do that; somebody else would have to do it. The law doesn't permit them to use drugs.

What can a nurse be to a man who is practicing a certain limited type of therapy for which the nurse has never been trained and is not familiar? The things which she would be called on to do are things which are absolutely illegal for him to do. As far as the chiropractor is concerned, he is limited by law to the treatment of the spine and the joints. I should like to ask what a highly trained public health nurse can do for a man whose treatment is limited exclusively to the spine and the joints. Of course, if the chiropractor is going outside of those barriers where he has no business, he might call in a nurse to do something illegal for him.

I wrote to Miss Fox who is in charge of the Red Cross in Washington and whom I know very well. I should like to read what I wrote to her. I should like to have the House of Delegates consider this matter and take any action they may see fit. I think this matter should be distinctly called to the attention of the medical profession.

Dr. Wright read the letter which follows.

May 2, 1929.

Miss Elizabeth Fox,
Director of Public Health Nursing Service,
American Red Cross,
Washington, D. C.

My dear Miss Fox:

I remember with pleasure meeting you at a dinner given by Mrs. W. H. Lee last year, and the very interesting discussion we had about public health nursing; also that we seemed to see the various phases of the work from the same angle. Therefore, I take the liberty of writing you concerning a new policy which apparently has been adopted by the Red Cross, that is, permitting Red Cross nurses to assist osteopaths and chiropractors in this state.

I feel that this action by the Red Cross is a very great mistake and a definite step backward. It is true the osteopaths and chiropractors have been licensed by the State of Minnesota. Their licenses are limited to specific types of treatment in which the public health nurse has no training or experience, and as long as they confine themselves within the scope of their licenses it is difficult for me to see what a highly trained nurse could do for them in their work.

We have had this matter up before the Visiting Nurses Board in Minneapolis and, after thoroughly considering the problem, we came to the conclusion that, first, it would lower the standing of the nursing profession by asking them to work with poorly trained or partially trained men; and second, after interviewing both the Chiropractic Association and the Osteopathic Association, we came to the conclusion that nurses could be of practically no value to them where they confine their work within the scope of the law. As you know, in many cases they are not confining themselves within their legal barriers and the nurse would constantly be called upon to do things which were contrary to her training. If she refused, it would only lead to controversy and would get nowhere.

This action, it seems to me, is a mere gesture on the part of the Red Cross to satisfy some uninformed group. I cannot believe that you, personally, are in favor of this move, and I can assure you that, as far as the State of Minnesota is concerned, it is going to lower the standing of the Red Cross nurse in the minds of the medical profession in this state.

Regretting that I cannot see you personally and talk this matter over, I remain

Very sincerely yours,

DR. WRIGHT: I think the House of Delegates ought to take some action in this matter. It is a very insidious way to create trouble. I would recommend that the Council be empowered to appoint a committee to draw up a resolution on the part of the House of Delegates and forward it to the Red Cross, and I so move. I also move that Dr. Earl's report be accepted.

DR. BOLEYN: I second the motion.

PRESIDENT CHRISTISON: You have heard the comments of Dr. Wright of the Reference Committee. I should be rather gratified if some of you would express your opinions with respect to this particular phase of the work before I put this motion.

DR. B. W. KELLY (Aitkin): I do not think that motion is quite clear. I should like to ask if Dr. Wright's motion refers to the main report.

DR. WRIGHT: I meant the acceptance of the report. I think these two specific things should be acted on separately, and I was going to so recommend. After the report has been accepted, I should recommend the adoption of these two resolutions.

PRESIDENT CHRISTISON: We will vote on the acceptance of the report, and then take up the resolution.

The motion to accept Dr. Earl's report was put to a vote and carried.

DR. WRIGHT: I should like to move that the resolution presented by the Committee on Public Health Education be adopted with regard to white flour.

Dr. Kelly seconded the motion which was put to a vote and carried.

Dr. Wright: I move that the Council be instructed to appoint a committee to draw up a resolution and forward it to the Red Cross condemning their action in nursing for cults in the state of Minnesota.

Dr. Boleyn: I second that motion.

President Christison: Has anyone any remarks to make?

Dr. F. A. Erb (Minneapolis): I am certainly in favor of condemning this procedure, but I wonder how we can do it. It looks to me as though we were liable to get in a little deep if we make it too strong. There is no question but that the osteopaths and chiropractors are allowed to practice in Minnesota. They are licensed. In the city of Minneapolis these nurses are supported by the Community Fund. I don't quite see how we are going to get around it. It is a question in my mind whether we won't stir up a lot more trouble if we go too far in the matter.

Dr. Wright: Why take a step backward? Who supports the Red Cross? Who are the heads of the Red Cross organization in the state of Minnesota? To a large extent, they are physicians. I contend if the organized medical profession takes concerted action, just as we did in Hennepin County, the proposal will never get to first base. What do these men represent in the community as compared to the ecenomic pressure behind the 2500 doctors in the state of Minnesota? Why should we not express our opinion on this?

I believe it is our duty to defend these nurses, for one thing. This is not an action by the nurses. This is an action by some group which is trying to make the nurses work for the osteopaths and the chiropractors, and I do not believe we should stand for it for one single moment. The nursing profession would like to keep their profession one that is looked up to and respected. They are graduated and trained under our own profession. Why shouldn't we stand up for them and defend them, and try to keep them from backing up and going into this kind of thing?

Dr. F. C. Schuldt (St. Paul): I represent a large training school for nurses in this city, and just last Saturday evening I passed out diplomas to fifty graduate nurses. These nurses have been trained for three years in regular medicine as we understand it. If these graduate nurses are expected to nurse for osteopaths and chiropractors within the next few months they will consider themselves badly deceived by their community and the teaching of the medical profession. If we haven't enough votes here to uphold our own profession and the teaching of our own nurses, they will consider us a little bit two-faced.

Dr. Kelly: I should like to endorse most heartily and enthusiastically the remarks of Dr. Wright and this other delegate. Certainly the Red Cross would not be in existence today were it not for the original work and the continued support of the medical profession; and the trained nurse as we know her would not be known today were it not for the work of the medical profession for her in creating that position of work. Certainly, it would be very small on our part, it seems to me, to lie down and let this small group of cultists ride over us. I am in favor of protesting most earnestly and as strongly as possible against the action of the Red Cross in this matter.

Dr. H. M. Johnson (Dawson): I think there is more to it than this letter. I understand that the Red Cross has gone at this independently of State Boards of Health. That is what they did down South when we had the flood. They didn't want to work in co-operation and harmony, but through force of circumstances somebody controlled the transportation and they had to work with the State Boards of Health. I understand they didn't want to.

They are supposed to work in coöperation and harmony with the State Board of Health, but I believe there have been occasions in this state when that understanding has been violated.

I, for one, feel we should stand back of our nurses. If we are going to let the Red Cross do just as it pleases, and are going to eat anything out of its hand it chooses to feed us, well and good; but if we are going to put up a little scrap we had better begin before it is too late. (Applause.)

President Christison: Gentlemen of the House of Delegates: I notice Dr. Morris Fishbein, editor of the Journal of the American Medical Association is here. I will ask Dr. Fishbein to give us an expression of his opinion on this particular subject. (Applause.)

Dr. Morris Fishbein (Chicago): Mr. President and Members of the House of Delegates: I have not thought particularly about this point although I have, from time to time, thought a great deal about osteopaths and chiropractors and nurses and the American National Red Cross.

There are in the United States today about 9,000 osteopaths, about 15,000 to 20,000 cultists of all types including naturopaths and other peculiar sorts of doctors.

In 1890 about 350 nurses were graduated in this country. Last year 18,000 nurses were graduated in this country. This tremendous increase in the number of nurses is represented, of course, by the increase in hospitals, and the increase in the total number of hospital training schools. Within the United States, we now have almost 8,000 hospitals whereas about 1900 we had less than 1,000 hospitals.

When there is an over-production of any certain type of service, there comes to be an attempt to develop a wider use for that type of service. There has not been any shortage of registered nurses. There has been a tremendous shortage of nurses who were willing to go into homes and nurse people in a way in which the old-time nurses had to nurse sick people.

I look on all of this attempt not entirely as an attempt on the part of the Red Cross to help osteopathy and chiropractic, but as an attempt to find wider employment for a tremendous over-supply of nurses who have been over-educated in many ways. The osteopaths have always attempted to get into

the practice of medicine by the back door. Just as soon as an osteopath is educated, or under-educated in the manner in which he is, and gets into the practice of healing he commences to broaden out. In the state of Washington, for instance, the osteopaths, having discovered that the tonsils were near the surface and could be jerked out without a great deal of difficulty, undertook very promptly to do tonsillectomy. It was found by the osteopaths that obstetrics would frequently go on in quite a normal manner if left entirely alone; therefore, obstetrics became a by-product of osteopathy.

Then the osteopaths found that by the manipulation and pulling of legs some pain was induced, and that in order to avoid pain it was desirable to have anesthetics. So they began to use chloroform and nitrous oxide.

In many other states they found that the use of narcotics was a highly remunerative procedure, and they have begun to apply for the right to prescribe narcotics. A bill to give osteopaths the right to prescribe narcotics is before the Missouri state legislature at the present time. In the state of Pennsylvania osteopaths attempted to prescribe morphin and cocain, and their derivatives, and it was necessary for the state to hand down a decision that pharmacists were not compelled to fill prescriptions from osteopaths for these narcotic drugs.

When the Volstead Act was passed in those states in which physicians were entitled to prescribe liquor, the osteopaths naturally wanted that same source of income. Therefore, the osteopaths have been reaching farther and farther in their endeavor to practice medicine.

In the state of California there are more than 500 osteopaths who have been licensed by their board to practice complete medicine and surgery. Their strength is so great that in Los Angeles, I am reliably informed, the County Hospital is divided in two parts, osteopathic and regular medical. The patient has no choice. If he happens to come in at a certain time he is assigned to the osteopathic division, but if he comes in at an alternate time he goes to the regular medical division. I suppose he waits outside to know what chance he is going to have when he comes in.

This not only represents a menace to the regular medicine of the country, but to the nursing profession and the people of the country.

The American National Red Cross is supported by the people of the United States. It has always attempted to coöperate with the medical profession, except perhaps for a very brief period just after the War. In connection with the flood disaster down South, the American Red Cross made a definite effort to coöperate with the American Medical Association. Through our Committee on First Aid, Red Cross officials are informed that the President and Secretary of the County Medical Society are the first to be called in times of emergency in order to aid in the organization of medical service for first aid.

I am not sure just what animated Dr. William DeKleine in issuing this regulation. I know his background somewhat. For a while he was health officer in the state of Michigan, and I am reliably informed that he is the basis for the character of Pickerbaugh in Sinclair Lewis' novel "Arrowsmith." Whether this means anything to you or not, I am not certain, but he is that type of health officer.

It is, of course, a menace to the nursing profession to have nurses go into homes and nurse patients under osteopathic procedure. That is bound to help osteopathy because any well-trained nurse will give the patient better care than the osteopath can give. On the other hand, I think all of us must realize that in many instances good nursing is more important than any other kind of attention, and it may be for the best interests of the patient in every case to have a good nurse to go into the home and take over the case. If she is a really good nurse, she is likely to tell the patient that the main thing he needs is to get rid of the osteopath and get in a good doctor. We can hope that will be the end result.

I believe that if this State Society, the American Medical Association and other organizations very promptly present their protest against this letter of Dr. DeKleine's to the National Red Cross, it will very soon be withdrawn. (Applause.)

Dr. W. F. Braasch (Rochester): I make an amendment to the motion of Dr. Wright made that the delegates of this state carry on this same resolution to the House of Delegates of the American Medical Association.

The motion was regulary seconded, was put to a vote and carried.

Dr. Fishbein: I just spoke to Dr. Wright. Of course, I don't know Dr. Wright's original motion, or resolution, but a thing of this sort should be handled much sooner than that. There is no reason for waiting until next July to handle this thing. Immediate protest by this body to the American National Red Cross would probably bring about an immediate revocation of this action. I doubt that this represents an action of the central body. This seems to be an action of the Mid-Western representatives, and not a national matter.

Dr. Braasch: The amendment won't interfere with the motion in the slightest.

Dr. W. A. Jones (Minneapolis): I move the original question.

President Christison: I will ask Dr. Wright to repeat the original motion.

Dr. Wright: The original motion was that the House of Delegates of the Minnesota State Medical Association send a resolution to the national organization of the Red Cross condemning the use of the Red Cross nurse by the osteopath and chiropractor.

I did ask that the Council be requested to appoint a committee to send such a resolution.

The motion was put to a vote and carried.

President Christison: Next is the report of the Editing and Publishing Committee by the secretary, Dr. Armstrong.

Dr. Armstrong read the report of the Editing and Publishing Committee.

REPORT OF EDITING AND PUBLISHING COMMITTEE MINNESOTA MEDICINE

January 1, 1928 to December 31, 1928

In presenting a report on the publication of our Association journal, MINNESOTA MEDICINE, at this time your committee desires to state that the report covers the calendar year of 1928 rather than a fiscal year as has been the practice heretofore. This change is made necessary by reason of the action taken at a meeting of the Council in the fall of 1927, which provided for the operation of the journal on a calendar year basis.

The financial state of the publication continues in a very satisfactory condition. The year of 1928 shows net cash receipts in excess of expenditures, amounting to $916.11. A check covering this amount is submitted to the treasurer with this report.

Volume XI of MINNESOTA MEDICINE, which includes the twelve issues published during the year 1928, contained a total of 1,256 pages, an average of 104.6 pages for each month. Of this total, 834 pages were devoted to reading matter and 422 pages to advertising, an average for each month of 69.5 pages of reading material and a fraction more than 35 pages of advertising. The total number of articles published during the year was 129 of which 23 were case reports. It is interesting to note that 3 of the articles published were contributed by laymen. The volume contained 273 illustrations, an average of a fraction less than 23 for each issue. Of these illustrations four were full page size.

As additional evidence of the value accruing to our Association of owning and publishing its own journal, let us state that the reading material supplied the members of the state association through the columns of MINNESOTA MEDICINE last year, amounted in volume to a book containing 834 pages with 273 illustrations. This large volume of educational material was furnished at a net cost per capita, of approximatcly $1.00.

The fact that MINNESOTA MEDICINE published a larger volume of reading matter in 1928 than in previous years is especially notable since no scientific sessions of the State Medical Association were held at the last meeting, and most of the material published was therefore necessarily drawn from individual contributions. Some of the smaller associations, of which MINNESOTA MEDICINE is the official journal, were also not represented this year in publication of papers owing to the fact that their sessions were mostly clinical.

Several changes were made in the journal during the year both editorially and typographically, but, as most of these changes were reported at the June 1928 meeting, it is not necessary to repeat them at this time.

The circulation of MINNESOTA MEDICINE at the end of the year was as follows:

Members (paid)	2,000
Members (delinquent)	110
Outside subscriptions	122
Miscellaneous copies distributed (exchanges, complimentary copies, advertising copies, etc)	378
Surplus on file	140
Total	2,750

The following report of receipts and disbursements was submitted to the secretary of the Association in January, 1929.

CASH RECEIPTS

Subscriptions—Members	$4,000.00	
Subscriptions—Non-Members	352.85	
Bad Accounts Recovered	168.27	
Illustrations	47.84	
Advertising	9,342.47	
		$13,911.43

DISBURSEMENTS

Journal Expense	$11,753.61	
Legal Expense	55.57	
Discount Allowed	1,186.14	
		12,995.32
Surplus cash in bank		$ 916.11

Accounts Receivable December 31, 1928	$1,622.67
Paper Stock on Hand December 31, 1928	141.31

Respectfully submitted,

EDITING AND PUBLISHING COMMITTEE

J. M. ARMSTRONG, Secretary.

PRESIDENT CHRISTISON: This report has already been referred to the Reference Committee. I will ask Dr. Wright if his Committee has any comments to make upon it.

DR. ARMSTRONG: The Reference Committee asked me to say what we have already said before that if there are any criticisims to make of MINNESOTA MEDICINE the Committee would be very glad, indeed, to hear them. We realize that we can improve the Journal. We are trying to do the best we can.

DR. WRIGHT: We felt that should be impressed on the membership. This is your Journal, and we want everyone to express an opinion.

As far as the Editing and Publishing Committee is concerned, we feel quite sure they are doing their very best to make this the best Journal they can. Whether it represents all the points of view in the Association, or not, is a question for the House of Delegates to decide.

This Report has been audited by the auditor who passes on the funds of the State Association, and I move the report be adopted.

DR. H. M. JOHNSON: I second the motion.

The motion was put to a vote and carried.

PRESIDENT CHRISTISON: Next is the report of the Necrologist, Dr. Olga Hansen.

Dr. Olga Hansen read the report of the Necrologist.

NECROLOGIST'S REPORT

Since the last report of the Necrology Committee the following members of the medical profession of minnesota have been called from our ranks by death:

MEMBERS OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Frank G. Landeen, Stillwater. Born 1872. University of Minnesota, 1894. Died May 20, 1928. Age 55.

(Past president and secretary Washington County Medical Society.)

Hugh Williamson Reynolds, Hibbing. Born 1888. University of Minnesota, 1914. Died June 30, 1928. Age 40.

Henry H. Frudenfeld, Minneapolis. Born 1876. Medical Dept. University of Illinois, 1902. Died June 19, 1928. Age 51.

Hannibal Hamlin Kimball, Minneapolis. Born 1843. Medical School of Maine, Portland, 1866. Died July 9, 1928. Age 84.

William Doms, Woodstock. Licensed Minnesota under the act of 1887. Born 1858. Died July 25, 1928. Age 70.

Arthur Bertram Moulton, Lewiston. Born 1876. Medico-Chirurgical Coll. Phila. 1900. Died May 12, 1928. Age 52.

Frederick G. Kohler, Minneapolis. Born 1876. Med. Dept. Hamline U. 1897. Died August 2, 1928. Age 52.

George Leslie Atkins, Jackson. Born 1876. State U. of Iowa Coll. Med. Iowa City, 1905. Died Sept. 13, 1928. Age 52.

Robert McEwen Phelps, Faribault. Born 1858. Rush Med. Coll. Chicago, 1885. (f. on staffs Rochester State Hospital and St. Peter State Hospital.) Died October 22, 1928. Age 70.

Theodore Tennyson, Minneapolis. Born 1869. No. Med. Coll. St. Louis, 1898. Died Oct. 29, 1928. Age 59.

Wm. Philander Lee, Northfield. Born 1872. Univ. of Minn. Coll. M. & S. 1894. Died Nov. 8, 1928. Age 58.

Arthur Henry Steen, Cottage Grove. Born 1850. Rush Med. 1874. Died Nov. 14, 1928. Age 78.

Willard B. Pineo, Minneapolis. Born 1858. Minn. Hosp. Coll. Minnesota, 1885. Died Nov. 3, 1928. Age 70.

Peter A. Aurness, Minneapolis. Born 1860. University of Minnesota, 1892. Died Dec. 7, 1928. Age 68.

Edgar Reginald Barton, Minneapolis. Born 1872. M. Dept. Hamline U. 1901. Died Dec. 7, 1928. Age 56.

Frank Woodward Metcalf, Fulda. Born 1875. Rush Med. Coll. 1906. Past president Southwest Jackson Med. Soc. Died Jan. 7, 1929.

Lewis Edward Nelson, Hendricks. Born 1893. Univ. of Minn. 1923. Died Dec. 12, 1928. Age 35.

Charles Lyman Greene, St. Paul. University of Minnesota Col. of Med. and Surg. 1890. Chairman of Section on Practice of Med. of the A. M. A., 1913-14; formerly professor and chief of the dept. of med. at U. of M. Past president of Minn. State Med. Assn. Died Jan. 19, 1929. Age 66.

Francis M. Smersh, Owatonna. Born 1858. Bennett Col. Electric M. & S. Chl. 188. Homeo Hosp. Col. Cleveland 1889. Died December 1928. Age 70.

Christian Peterson, Owatonna. Born 1857. Illinois M. Col. Chicago. Died September 23, 1928. Age 71.

Arthur Ambrose Sweeney. Harvard U. Med. School 1886. Born 1858. Died November 7, 1928. Age 70.

Charles F. Nootnagle, Minneapolis. Born 1863. Bellevue Hosp. Med. Col. 1887. Died Feb. 28, 1929. Age 65.

Pearl Mitchell Hall, Ah-gwah-ching. Born 1860. Hahnemann Med. Col. and Hosp. Chicago, 1882. Died July 18, 1928. Age 61.

L. M. Brunet, River Rouge, Mich. Victoria U., 1874. Born 1849.

J. E. LeClerc, LeSueur. Laval, 1893. Born 1868. Age 61.

P. S. Vistaunet, Shelly. U. of Minn. 1906. Born 1868. Age 61.

W. E. Browning, Caledonia. McGill. 1899. Born 1873. Age 56.

The following were not members of the State Medical Association at the time of death:

Geo. Henry Overholt. Albany Med. Col. 1866. Born 1842. Died Feb. 23, 1928. Age 86.

Martin L. Murphy, Browerville. Born 1858. Curtiss Physio Medical Institute, Indianapolis, 1892. Died March 1928. Age 69.

Pearl D. Winship, Park Rapids. Born 1841. Col. Phys. & Surg., Keokuk, Iowa, 1878. Died Feb. 1928. Age 87.

Frans L. Norin, Roseau. Born 1858. St. Paul Med. Col. 1886. Died April 6, 1928. Age 69.

Gustav A. Eisengraber, Granite Falls. Born 1858. Minn. Col. M. & S. Minnesota 1901. Died August 8, 1928. Age 70.

Edward F. Kennedy, St. Paul. Born 1884. M. Dept. Hamline U. 1908. Died Oct. 1928. Age 44.

Willis Clay, Waterville. Born 1854. Rush Med. Col. 1880. Died Nov. 30, 1928. Age 74.

Nelson H. Marshall, Chaska, Minnesota.

John Wyatt, Minneapolis, Minn. Born 1845. Age 84.

Otis J. Brown, Little Falls, Minn. Born 1856. Med. Dept. Western Reserve Univ., Cleveland, 1882. Died March 28, 1929. Age 72.

G. L. Saylor, Hibbing. Born 1851. (Licensed Minn. 1887.) Died Feb. 1, 1928. Age 77.

Charles Everett Hartley, Carver. Born 1855. Bennett Med. Col. Chicago. Died Sept. 19, 1928. Age 73.

Johannes K. Moen, Minneapolis. Born 1867. U. of M. 1893. Died Feb. 3, 1929. Age 61.

David Albert Locke, Minneapolis. Born 1855. General Med. Col. Chicago, 1884. Died Feb. 28, 1929. Age 74.

Men of varying powers and personalities were these, with lives leading them through many pathways of opportunity and endeavor. But a characteristic common to them all was their love for mankind. "Their work has been better for their love and their love has been sweeter for their work."

(Signed) Olga S. Hansen, Necrologist.

President Christison: May I ask that the members of the House stand with bowed heads for a moment in memory of these, our departed brethren.

The audience arose and stood in silence.

President Christison: The next report is that of the Committee on Hospitals and Medical Education by Dr. N. O. Pearce of Minneapolis.

Dr. Pearce read the report of the Committee on Hospitals and Medical Education.

REPORT FROM THE COMMITTEE ON HOSPITALS AND MEDICAL EDUCATION OF THE STATE MEDICAL ASSOCIATION FOR THE YEARS 1928 AND 1929

Your committee on Hospitals and Medical Education are pleased to report that the program of this committee has met with gratifying success during the past year.

The committee has had three major undertakings, the first being, the *Extension Courses,* second, the *Toxin Antitoxin Campaign,* and third, the *Consultation Bureau.*

It is unnecessary for me to repeat that the Extension Courses are a joint undertaking of the Minnesota State Medical Association, the Minnesota Medical School and the Extension Division of the University. We believe the continued interest in this educational endeavor indicates that they are of real value and are becoming more popular from year to year. These courses are becoming, as they should, a regular part of the year's program for many county society groups.

Since the first of May, 1928, at which time the work of this committee was reported to the House of Delegates, there have been completed ten Extension Courses. There are now three courses in progress, one at Marshall, one at Mankato and one at Olivia. Letters have been sent out to all groups who have had previous courses inviting them to get organized for the coming year as soon as possible so that the programs may be properly arranged. During the past year, courses were held for the first time in Mankato, Olivia, Willmar, Buffalo, St. Cloud and Wadena. Two of these, as you will note, Mankato and Olivia, are starting on their second group of lectures. Marshall, Tracy and Tyler still carry the distinction of having had the largest number of these courses—the one now in progress being their fifth.

Your committee thought it might be of interest to present statistics representing the cost of and attendance at these lectures courses and so have compiled those of last year for your information.

Marshall, Tracy, Tyler

April 17 to June 5, 1928, 25 registrations, cost $185.00; cost per lecture, $23.12; 8 lectures, one man each time; cost per lecture per person, 92½c.

Worthington

July 6 to October 9, 1928, 35 registrations; cost $112.50; cost per lecture, $18.75; 6 lectures; cost per lecture per person, 53½c.

Mankato

August 22 to October 24, 1928; 22 registrations; cost $160.00; cost per lecture, $16.00; 10 lectures, one man each time; cost per lecture per person, 73c.

Olivia

September 11 to October 30, 1928; 33 registrations; cost $75.00; cost per lecture, $9.37; 8 lectures, one man each time; cost per lecture per person, 28c.

Willmar

September 20 to November 8, 1928; 20 registrations; cost $87.00; cost per lecture, $10.88; 8 lectures, one man each time; cost per lecture per person, 58½c.

Buffalo

September 20 to November 1, 1928; 12 registrations; cost $27.00; cost per lecture, $4.50; 6 lectures, one man each time; cost per lecture per person, 37½c.

St. Cloud

October 1 to November 19, 1928; 18 registrations, cost $90.00; cost per lecture, $11.25; 8 lectures, one man each time; cost per lecture per person, 62½c.

Wadena

November 13, 1928, to Jan. 29, 1929; 30 registrations; cost $246.00; cost per lecture, $22.36; 11 lectures; cost per lecture per person, 74½c.

Mankato

Nov. 15 to Dec. 20, 1928; 35 registrations, cost $80.00; cost per lecture, $16.00; 5 lectures; cost per lecture per person, 46c.

Duluth

Dec. 3, 1928 to March 25, 1929; 60 registrations; cost $315.00; cost per lecture, $39.27; 8 lectures; cost per lecture per person, 65c.

Marshall

April 2 to May 14, 1929; 22 registrations; cost $160.00; cost per lecture, $22.85; 7 lectures; cost per lecture per person, $1.04.

Mankato

April 4 to May 2, 1929; 15 registrations; cost $80.00; cost per lecture, $16.00; 5 lectures; cost per lecture per person, $1.06.

No. of physicians registering, 327; No. of lectures, 90; No. of lecturers, 56.

It will be noted that the cost per person per lecture is in no case excessive and in some cases very small indeed.

There are still large districts in the State which have shown little or no interest in these courses and we appeal to you again as we did last year for any suggestions you might have to arouse interest in this work. The best results in the past have come from personally presenting details of organization, etc., at County Medical Society meetings and it is the intention of the chairman to visit with Dr. Meyerding and other officers of the Association, as many as possible, County organizations where they have not had courses during the summer and fall. We cannot leave this subject without expressing our appreciation of the fine cooperation of Mr. Price, the Extension Division, and of the Medical School faculty, and we hope that Dr. Braasch is taking some pride and satisfaction in the progress of this program which he was responsible for starting.

TOXIN ANTITOXIN CAMPAIGN

Dr. C. B. Wright, the past president of the Association, has during his visits among many county organizations, been impressed with the fact that rural physicians have not been sufficiently interested in the matter of immunization of small children against diphtheria. He presented this idea to the committee on Hospitals and Medical Education and in coöperation with the State Board of Health, plans were discussed for a state wide campaign among physicians, with the idea of interesting them in this very important prophylactic measure. The underlying thought being that if physicians themselves do not undertake as a part of private practice the task of diphtheria prophylaxis among in-

fants and juveniles, it will become imperative for the State Board of Health or some other organization to take this matter in hand. The plan developing, to which, unfortunately, sufficient attention has not been directed, is to have every physician at the time of birth of a child, inform the parents of the importance of having the infant immunized against diphtheria and small pox on or before they reach one year of age; the State Board of Health agreeing upon receipt of birth certificate, to send appropriate literature to the parents, urging the same idea.

It was the plan of the committee to send out speakers, familiar with methods of immunization, to different county medical organizations prepared to make demonstrations and give complete data and instructions. This has been done in a few cases, but owing to the influenza epidemic and other things which have kept all physicians so busy this winer and spring, the program has been allowed to lag. Your committee would like to invite discussion of the necessity of this project and the best means for carrying it out.

The third activity—the Consultation Bureau—because of its recent inception, is today the one of most interest. The establishment of this Bureau has been under consideration by your committee for many months and the idea has been presented before a number of County Medical organizations and before the County Society Secretaries at the recent meeting in St. Paul. It has met with the approval of the council, who provided the necessary means for the establishment and maintenance of this service over a trial period of eight or ten months.

The following letter, which was addressed to all members of the Association and which appeared in the April issue of Minnesota Medicine, sets forth a statement of the aims of the Bureau and the methods of operation:

ANNOUNCEMENT EXTRAORDINARY

It is with the greatest pleasure that your committee on Education of the State Medical Association announces the inauguration of The Consultation Bureau for the members of this Association.

Pursuing the policy that the State Association should do all in its power to promote the highest standard of medical practice among its members, we have organized and placed at your disposal the facilities and resources of a consultation service, with headquarters in the Saint Paul office of the State Association.

For the time being the Bureau will be conducted under the general supervision of a sub-committee of the Committee on Medical Education composed of N. O. Pearce, Minneapolis, E. H. Hammes, St. Paul, F. J. Hirschboeck, Duluth, and G. E. Brown, Rochester, with Wm. A. O'Brien, Assistant Professor in Pathology, well known medical authority, as director in charge.

The function of this Bureau is to furnish the members of this Association with prompt and confidential information on any subject relating to the practice of medicine. The resources of a staff of the most competent consultants in every line of medical endeavor will assist Dr. O'Brien in obtaining for you the information desired. The Medical Educational Committee now has an Extension Course faculty of approximately three hundred specialists and it is the plan of the committee that this group will furnish the nucleus of a consultation staff for the Bureau although Dr. O'Brien will feel free to call on any member of the Association for an opinion. No question is too trivial and no problem too large for you to submit to this Bureau.

This enterprise of the State Association will furnish its members an unexcelled opportunity for a private and confidential informal consultation on problem cases. The director and his secretary will be the only persons to know the identity of the physician making consultation request. Prompt reply will be the keynote of this service and there will be no charge.

Telephone or telegram consultations, while ordinarily unsatisfactory, will be accepted in emergency cases, all such expenses to be borne by the requesting physician.

A Question and Answer Column in Minnesota Medicine will be conducted by this Bureau. Watch this space for interesting bits of information and case analysis.

Address all communication to Consultation Bureau, Minnesota State Medical Association, 11 West Summit Avenue, St. Paul, Minnesota.

N. O. Pearce,
Chairman, Committee on Medical Education.

While it is too early to make any prediction as to the ultimate success of this undertaking, the amount of interest and the number of letters and inquiries received so far by the Bureau, which has not been advertised to the members except by the circular letter and notice in Minnesota Medicine, would indicate that a great many of the members of the Association will take advantage of and will receive benefit from having such a source of information available.

Before closing the report on the Bureau, I should like to ask Dr. O'Brien, director of the Bureau, to present a summary of the work of the Bureau up to this time.

In closing, the committee wishes to express their appreciation to the officers of the State Association for their cordial coöperation in furthering the program of the committee. A great deal of credit for the success of the Extension Courses should go to Dr. C. B. Wright, Past President, who has done much to inspire the organizing of local medical groups during his travels over the state.

Dr. Christison has shown a lively interest in the Welfare Bureau, and your chairman has received much valuable advice in discussing matters with Dr. Herman Johnson.

The program owes a great deal to Dr. Meyerding and his headquarter staff, who give us prompt, intelligent, reliable and efficient service, with unfailing courtesy on every occasion. And lastly, the chariman would like to express his appreciation of the coöperation and help of the other members of the committee.

This report is respectfully submitted.

N. O. Pearce, Chairman.

Dr. Wright: We commented on the excellence of this report, and the amount of work this Committee is doing. This is one of the most important activities of the Association, and we felt we should simply present this report without any particular comment, except as to its excellence. We hoped there would be discussion of this activity with regard to its possible betterment in any way.

President Christison: Dr. O'Brien, will you say something about it, please?

Dr. W. A. O'Brien (Minneapolis): The Consultation Bureau was started March 21. Since then we have been called on thirty-one times for assistance. It was our idea to help men in the profession who, when they struck a snag in handling a patient, wanted some information. It is rather nice to know that over half of the inquiries have been along those lines. We have had nine questions on therapy, new drugs, and one inquiry on patent medicine. That was in regard to Professor Funder's tablets. Every one of you know who Professor Funder is. He has devised a sure cure for ulcer.

We had two inquiries on legal matters. One man wanted to know what sort of books to buy. Another man asked about a certain Journal, and another was particularly anxious to know where he could get surgical training. There were other questions on such varied subjects as: How to keep the patella up; What are the possible complications of a patient with otitis media; The question of differential diagnosis between Hodgkin's disease and pseudoleukemia. One man wanted an assistant, which we were very glad to get for him.

We hoped to make this a very good service. We have tried to do that, but there are many questions that stick us. We answer each question as soon as we receive it. We feel it is very much better to send a well thought out answer than a half-baked letter in reply.

This service seems to be filling a need. These questions are coming in rather regularly now, and in the coming Journal we are going to publish some of the more interesting ones, which will answer questions for more people and stimulate interest in the Bureau.

When a man sends me a question I immediately begin to scratch my head as to who will be the best man to answer it. I get busy on the telephone, and very often by letter, sometimes writing three or four men for an opinion on a question. In that way I get a representative view. The letters are kept in a personal file, and the person asking the question is not known to any of the members. (Applause.)

President Christison: Are there any further remarks?

Dr. B. S. Adams (Hibbing): I just want to offer my appreciation to Dr. O'Brien and his Committee. I had occasion to write an inquiry after this Bureau was started. The answer was prompt, very courteous, very complete, and very satisfactory. I read the Medical Journal. The answer came first, and it was very satisfactory. It is fine work.

Dr. Fishbein: We have found an increasing demand for this type of service in the past five years. Dr. Pierce and Dr. O'Brien were down at the headquarters' office and talked the service over with us before it was undertaken here in Minnesota State.

We receive about thirty questions a day from doctors all over the country specifically having to do with such matters as Dr. O'Brien mentioned here. This does not include requests for references to the literature, or requests for package library, but questions having to do with difficult diagnoses, having to do with the treatment of disease, and having to do with medico-legal subjects.

The most serious questions to handle are those that deal with medico-legal subjects, because on several occasions we have found that the answers we sent were being taken into court and used as evidence. Of course, that is a difficult matter and is likely to involve the organization in troubles that are not proper to the organization.

The most rapidly increasing group of questions that we have to deal with are those which concern industrial disease, and that, of course, is a problem which is just beginning to interest the medical profession in an organized way. I suppose we have an average of two or three questions each day having to do with the hazard involved in chromium plating, Duco painting, and the use of benzol and ethyl gas.

All our questions are referred to men who are recognized as authority throughout the United States. If we do not know a man who is an authority in any particular field, we look up the literature on the subject and send the question to two or three men who have made original investigations. This naturally involves some delay in the answer, but in several instances we have had telegrams for advice as to the treatment of a patient. It is impossible for any physician at a great distance to advise the treatment of a patient on the amount of information given in a telegram. Our common suggestion in those cases is to call in the nearest other physician as a consultant, with the idea that two minds will be better than one. It is a very hazardous thing to prescribe for a patient where you have about three lines of symptomatology, so we try to avoid direct answers in such cases by merely sending references to easily available literature.

This thing has grown very large in the Journal of the American Medical Association. Five years ago we had half a column to one column devoted to questions and answers per issue. We now run from two and one-half to four pages of questions and answers per issue, and we don't begin to print all that we receive.

We very soon found it was important to begin filing fifteen to twenty reprints of each answer that was put into type because questions begin to duplicate themselves very promptly, and it is possible to merely go through the files and pick out six or seven answers that have been printed previously and send these as answers to questions that come in.

On the whole, I believe this is probably one of the most valuable services the organized profession can render to the individual member. The organization is constantly being asked what it does for the individual physician, and this represents a real service for the individual physician. (Applause.)

PRESIDENT CHRISTISON: If there are no further remarks, the Chair will entertain a motion to adopt this report.

DR. C. L. HANEY (Duluth): I so move.

The motion was regularly seconded, was put to a vote and carried.

PRESIDENT CHRISTISON: We will now listen to the report of the Committee on Contract Practice by Dr. Webb of Minneapolis.

Dr. Webb read the report of the Committee on Contract Practice.

REPORT OF COMMITTEE ON CONTRACT PRACTICE

Your committee met March 30, 1929, at the St. Paul Athletic Club. Members present: Drs. McCloud, Colvin, McCarthy, White, Oerting and Webb.

The report of the committee of the previous year was read and informally discussed. The absence of action or recommendations concerning this report by the House of Delegates relieved us of special consideration.

It was the sense of this committee that we should exist to consider and act on things referred to the committee.

The report of the committee of the previous year showed that contract practice of medicine and surgery exists in Minnesota in a great many forms which are accepted and approved and most of which is a matter of necessity. The conditions of these various forms of contract practice are nearly all satisfactory to the medical profession. Recommendations were made last year concerning a few unsatisfactory conditions.

A form of contract practice which affects nearly all active practitioners in our state and to which very little constructive attention has been given recently by our state association, has been the care of injured employees under the terms of the Workmen's Compensation Act.

The laws have been passed by our state legislature concerning these injured employees. These laws are being improved and amended each session of the legislature and the state supreme court is settling disagreements and establishing new rules as a result.

Contracts with business and industry are in effect with insurance companies. Nearly every angle of the necessary contracts for carrying out this work has been covered by the various business interests involved.

The remuneration for medical services is to date covered by the words of the law which state that the charges shall be the usual charges to persons in the same community of similar station. Practically, however, a great many of these people would never be able to pay anything for medical services. The charges made by the profession are the same for these people as for ordinary regularly salaried people who would pay their way. The insurance companies are never given the benefit of a discount for services to people of the poorer class.

Business, represented by the insurance companies is not unmindful of this condition. When, therefore, the injured person is of higher standing, they object to proportionately higher charges.

The lack of a definite minimal or maximal fee schedule for the medical care of the injured employees has brought about a great many disputes between members of the medical profession and insurance companies. The Hennepin County Medical Society has established a committee to whom such disputes may be referred for arbitration with a similar committee from the insurance companies.

The conditions of medical care of injured employees recently became acute in New York. The report of Professor Rogers, published in the New York World was discussed by your committee. He described the unprofessional practices of fee splitting and whiskey prescription writing, etc. He stated that many of the evils complained of were due to the indifference and inaction of medical societies.

Your committee discussed the fee schedule of the state of Ohio for the care of compensation cases. The fee schedules of the State Accident Commissions of Oregon and Washington were also discussed.

In the present session of the Minnesota State Legislature, an effort was made to pass a law giving the Industrial Commission the right to establish maximum medical and surgical fees. This is an effort on the part of business to place this work on a more dependable basis.

The Committee on Contract Practice is impressed with the necessity for a study of fee schedules and feels that the time is fast approaching when, if we do not establish a schedule, that the matter will be settled without our assistance by the business interests. At present, for example, a majority of the doctors throughout the state charge the same fee for office visits, in compensation cases. There are some doctors, however, who charge more and there are some very capable doctors who charge less. When business furnishes us with a fee schedule we know which fee will be selected.

Your committee requests the House of Delegates to take action requesting or disapproving the drafting of a fee schedule applying only to medical services rendered to cases covered by the Workmen's Compensation Act.

Very respectfully yours,
COMMITTEE ON CONTRACT PRACTICE
ROSCOE WEBB, Chairman.

PRESIDENT CHRISTISON: Dr. Wright, has your Committee any comments to make on this report?

DR. WRIGHT: We went over this report and talked about it a long time. None of us was very familiar with contract practice, and we couldn't come to any conclusion. There are a number of controversial points which we believe should be emphasized and thoroughly discussed by this Association.

Dr. Webb stated that the Workmen's Compensation Commission, or probably the insurance companies, in other words, tried to establish a maximum fee. We had this thing before the legislature because we felt that the establishment of a maximum fee would not only be very bad for the profession, but might react on the patient because attempts were being made to reduce the fee. If they were willing to let the maximum fee go as high as they wanted, all right. There-

fore, if you are going to reduce the cost and set a maximum fee, you must have that fee lower because everybody is going to charge a maximum fee. No man is going to belittle his own service.

This fee schedule thing is another matter which is of very great importance. Are we going to wait until the state legislature is going to attempt to make a fee schedule, or are we going to get together on a minimum price? Some of the insurance companies are forcing a fee schedule down the throats of the younger men.

We haven't recommended the report because we are too much in doubt. We hope for a clean-cut discussion on this whole question, with possibly some decisive end.

President Christison: Does any other member of the House of Delegates desire to offer anything upon this report? It seems to me this is a matter of some importance.

Dr. F. H. Magney (Duluth): Anyone who is doing any compensation work at all is well aware of the fact that the insurance companies are trying to cut down fees in every way they can. Some companies are becoming so bold as to try to sign us up on contract for a maximum fee. I don't know how it is in the rest of the state, but I think there is a little competition in Duluth. Some men are rather favoring the insurance companies in order to get more of their work. Personally, I have charged less for compensation work from that type of patient, and I don't think my fees are large. Many of the insurance companies have instructed their companies in foreign labor not to send any more work to me than is absolutely necessary.

It is time we were doing something on this establishing of a fee basis. Surely, before long the insurance companies are going to establish a maximum fee basis which will not be very desirous.

Dr. A. G. Chadbourn (Heron Lake): I wonder if some of the rest of you gentlemen ever got any schedules sent out by two or three different companies. If I am not mistaken, I think I have in my office a schedule from the Fidelity Company of Gaylord, or somewhere up there. I have another one that I think is from the United States Fidelity, but I wouldn't want to swear to it until I had looked it up. Both of them sent schedules. If I am not mistaken, the one from Gaylord was higher than the other one.

Contrary to the doctor from Duluth, I charge more for the liability cases to the company than I do for the individual who comes to my office. Another thing: You get more for the individual call and the individual work, office dressing and things of that kind, than we boys do in the country.

That might be a little point, but I believe in one instance I was asked to sign an agreement. That was some two years ago. I was asked to sign an agreement that I would charge no more than they had. Those fees were about the same that I was charging, and I believe I signed it. I was foolish, wasn't I?

Dr. H. M. Johnson: I haven't much to say, except that the compensation law as it now exists in Minnesota provides that you are entitled to charge as much for your industrial work as you would be entitled to charge for the same kind of case in your community. The law also provides that if you are overcharging, the Commission has a right to cut your fees down. You don't have to take anything less than you are used to getting, but if you go too much above what they think you are entitled to, the Commission will cut the fee, which I understand has actually happened in some cases where the fee for industrial work has been extremely high. I think it has worked out fairly well.

It might interest this gentleman to know that the man who introduced that amendment to the Compensation Act, whereby the State Industrial Commission could set up our fees, lives in Gaylord. He is a senator, and there might be some connection between that bill and the insurance companies—possibly the Industrial Commission, because the Industrial Commission presented the bill.

Dr. W. A. Coventry (Duluth): I should like to state that we often have a fee schedule thrust on our desks which they ask us to sign. It is absolutely ridiculous; for instance, one dollar for an office call, and you do the dressing and furnish the material. As is well known, the man who comes around to try to induce you to sign your name to this schedule as an M.D. is an agent for this insurance company. He puts it up to you that everybody else in the state has signed it, and why don't you sign it. A few of the weak ones did. We haven't yet.

It is that type of propaganda by one of our own medical men—I don't know whether he is a member of the Society or not—that is getting under the skins of a lot of fellows, and in that way they sign a schedule that is absolutely ridiculous.

President Christison: If there are no further comments, the Chair will entertain a motion to adopt this report.

Dr. W. A. Jones: I move its adoption.

The motion was regularly seconded, was put to a vote and carried.

President Christison: The next report is that of the Radio Committee by Dr. Maxeiner of Minneapolis.

Dr. W. A. O'Brien read the report of the Radio Committee at the request of Dr. Maxeiner.

REPORT OF RADIO COMMITTEE

Sixty radio programs were broadcast under the direction of the Radio Committee from April 3, 1928, to April 30, 1929. Fifty-eight programs were sent out from Station WCCO and two from KSTP.

Regular health service programs were started at Station WCCO April 3, 1928, and have continued to date. Every Wednesday morning at 10:15 (summer) and 10:30 (winter), Dr. W. A. O'Brien, Assistant Professor of Pathology, University of Minnesota, has given a fifteen-minute talk on a selected medical topic. (See attached list). The majority had been requested by members of the radio audience. Ideas have also come from current events, local and national health drives, and seasonal diseases.

When Station WCCO officials met with the Radio Committee in March, 1928, the following plan was drawn up:

(1) The time and facilities of the Station—once a week and other special occasions—would be donated to the Minnesota State Medical Association. If we had to pay for this, it would have amounted to several thousand dollars.

(2) Only State Medical programs would be broadcast, and all medical advertising would be passed on by the Committee. This was voluntary on the part of WCCO. The Station has conformed strictly to the standards laid down by the American Medical Association. In one instance alone, a contract which would have paid many thousand dollars was refused by WCCO because of its objectionable nature.

(3) The talks would not be written and read, but would be talks in the true sense of the word. This has been done and has added greatly to the effectiveness of our program.

(4) While radio mail would be solicited, no diagnosis could be made or treatment suggested. In spite of this the volume of mail has been very great and many suggestions have been received in this way. The letters have been answered by Dr. O'Brien in person and a complete file has been kept.

As a result of the excellent response to our programs, the Station enlarged the morning service January 2, 1929. A five-piece orchestra now precedes and follows our service, and in addition, many other worthwhile features have been incorporated.

From the mail received, it was found that we reached Minnesota, North and South Dakota, northern Iowa, and Wisconsin. It is impossible to know exactly how many people listen to any program. Radio officials know the number of potential listeners, based on receiving sets and population. WCCO has a dependable audience of 1,264,936. There is a possible additional audience of 1,715,012. This gives a total possible audience of over 3,000,000 people. From estimates based on comments received, it is probable that our weekly audience is over one-half million listeners. We have tried to give the people what they want. The regularity and permanence of our service has also increased with the number of listeners.

Good publicity has been given by all the papers and the stations. Announcement of the program appears in Twin City papers on Sunday and Tuesday evening and Wednesday morning. In addition it is announced at least twenty times a week from the Station.

Replies indicate that we have had regular listeners from the very beginning. At a convention of women in St. Paul during the past winter, over two-thirds of the three hundred persons assembled indicated that they were listeners. Health clubs have organized in several parts of the state. In addition copies of radio talks have been read at a large number of club meetings.

Most of the audience is composed of women and sick persons. Women are vitally interested in health matters and through them we reach the family circle. Invalids and convalescents make up a large part of our audience. Because of this, great care is taken to approach all medical problems from an optimistic view point. Everyone likes the more cheerful side of the health message. There is little interest in national health problems. There is a great deal of interest in personal illness.

Your Committee feels that the radio is one of the most effective means of reaching a large number of people in a very direct personal way. By constantly keeping before them scientific facts and the high ideals of the medical profession, much good can be done. We earnestly request that this service be continued. We also wish to express our appreciation of the courtesy and coöperation received from WCCO. It would be desirable to have a regular system of supplying copies of the radio talks to those who wish them. Regular radio service under the auspices of this association will do a great deal to make the people of the Northwest "health-conscious."

HEALTH SERVICE PROGRAMS WCCO

Every Wednesday A. M.

April 3, 1928 to April 30, 1929

The Modern Health Problem
Well Balanced Diet
Fresh Air
Rest and Sleep
Prevention of Diphtheria
Typhoid Fever
Maternal and Infant Hygiene
The Goiter Problem
Care of Wounds
Rabies
How We Breathe
Diseases of the Liver
Outlook for Young Diabetics
The Circulation of the Blood
Vitamines
How the Well Can Help the Sick
What is a Neurotic?
How We Hear
The Cause of Cancer
Cathartics and Appendicitis
Factors in the Health Problem
Cancer of the Stomach
Correcting Nature's Mistakes
Cause of Anemia
Getting the Children Ready for School
Heat Stroke and Exhaustion
Obesity
Cancer of Breast and Uterus
Foreign Bodies
Paralysis and Will Power
Conquest of Tuberculosis
Influenza
Gas Poisoning
Children and Tuberculosis
Why We Worry
Physical Activity
What Is Arthritis?
Tularemia—a Disease of Animals and Man
The First Year
Fish as a Food
Burns
Ultraviolet Rays
Gall Stones

The Care of the Teeth
What the Modern Hospital Means to You
Problems of Maturity
Fractures
Varicose Veins
Emotional Instability
High Blood Pressure
Medical Superstitions
Mucus Colitis
Hay Fever
Cosmetic Nostrums—Dr. Arthur J. Cramp, American Medical Assn.
American College of Surgeons—David Jolly, Houston, Texas
Periodic Health Examination—Dr. W. D. Haggard, Nashville, Tenn.
Keeping Fit—Mr. R. O. Jones, Gorgas Memorial
Teen Age Problems—Dr. W. A. O'Brien (Hennepin Co. T. B. Assn.)
Pre-school Child—Dr. W. A. O'Brien (Federation of Women's Clubs)
Installation of President American Medical Association

S. R. MAXEINER, M.D., Chairman.

PRESIDENT CHRISTISON: Dr. Wright, has your Committee any remarks to make?

DR. WRIGHT: We move its adoption with commendations.

DR. H. M. JOHNSON: I second the motion.

DR. W. A. COVENTRY (Duluth): I make the suggestion that a vote of thanks be extended by this Society to WCCO for their many courtesies, and also to Dr. O'Brien. For years past we have never had radio programs that have been put over as they have by Dr. O'Brien, and which have had such a popular appeal.

PRESIDENT CHRISTISON: We have nobody else who can do those things in exactly the way Bill does them.

It has been moved and seconded that the report of this Committee be adopted, and that the thanks of this Association be extended to WCCO for their coöperation, and so on, and so forth.

The motion was put to a vote and carried.

PRESIDENT CHRISTISON: The next report is that of the Committee on Public Policy and Legislation. That, of course, is the real committee. I am not on it now, so I can say that. I think Dr. Sogge is going to read this report for us.

Dr. L. Sogge read the report of the Committee on Public Policy and Legislation.

REPORT OF COMMITTEE ON PUBLIC POLICY AND LEGISLATION

A careful summary of the activities of the Legislative Committee has been sent in a letter to every member of the profession. We hope you have read this report and familiarized yourself with the contents. It is entirely impossible to give any detailed account of how legislation is accomplished, or the many angles involved. One can only become familiar with the workings of the legislative body by close and intimate contact with individual members, as most of the work is done for or against a bill, before it comes up on the floor of the House, and what appears in the newspapers or what you hear in the Legislature is sometimes for effect on the public. Most of the legislators have made up their minds how they are going to vote on certain bills, and know all about them before they come up. The friendships made in both houses during the last two sessions have been maintained and strengthened in the present session, and many new friends have been found who were interested in the legislation proposed by the medical profession.

One of the first problems the Legislative Committee had to face was the fact that no money had been allowed in the Budget for the State Venereal Laboratory. There are various reasons why this had occurred, which we do not care to go into in detail. But the Committee immediately took steps to iron out those difficulties, which was no small task. Meetings were had with the State Board of Health, the Governor, the Big Three, and various members of the Appropriations Committee, and when full information as to its value had been shown up and other angles straightened out, an appropriation of $17,500.00 a year was allowed and passed. The State Board of Health assures us that this will take care of the laboratory so its efficient work can be continued in the future as it has in the past.

All of the bills which were opposed by the Legislative Committee were killed or modified in such a way that they were acceptable, and the bill which we undertook to pass very late in the session, went through with large majorities in both houses.

There were two attempts made to disturb the Basic Science law. The most detrimental one was the last Naturopathic Bill, which provided that they be granted Basic Science certificates without examination.

The Naturopathic Bill, which had a very powerful lobby, lead by an ex-congressman and a former member of the House, was so well handled in committee and the members were so well informed on this bill beforehand, that the only time it appeared on the floor of the Senate was when they tried to reject the Public Health Committee's report, which attempt failed. Another bill which was submitted died in committee without a hearing, although every effort was made to bring it out, especially the last night. They didn't expect to pass the bill, but they wanted to orate on it.

The amendment, establishing a maximum fee for compensation work, was defeated in committee due to careful work showing the ultimate results of such a law and careful presentation to members of the committee.

The bill opening up the hospitals to the various cults was killed in committee. We were somewhat surprised, however, at some of the friends of this bill in the legislature, and without careful handling and excellent educational work before the House and Senate, this bill might have stood a fair chance of passage.

The bill, placing the licensing of masseurs under the State Board of Medical Examiners, was successfully passed. This work was not started until late in the session, however, because we were not informed of the methods of the Massage Board, and it required a tremendous amount of hard work, both in getting information and presenting the facts before the House and

Senate, and very careful manipulation by the friends of the bill to get it to a final vote in the Senate.

The usual anti-vaccination and anti-vivisection bills would likely have been introduced if the profession hadn't been represented here. Also the osteopaths at one time proposed to introduce a bill which would have given them more rights and privileges. We cannot tell what other legislation would have been introduced if the profession hadn't had representatives looking after their interests.

In closing we wish to say that the Legislative Committee, at the beginning of this session, didn't believe there was much necessity of being on the job continuously. But the Legislature hadn't been in session more than two or three weeks until we found things had piled up so it was more than one man could take care of; as the letter tells you fully about this, we will not repeat it here. The committee now realizes from past experiences that the Association might as well assume that during every session of the Legislature there will be groups of self-seeking individuals who will try to get permission from the State to legalize some quick method of earning a living, on the most gullible of human-beings, those who are sick. And further, these groups are not only busy during the legislative session but they are busy all the year around. Therefore it is necessary that the Association guide itself accordingly.

PRESIDENT CHRISTISON: Dr. Wright, has the Reference Committee any comments on this report?

DR. WRIGHT: None whatever.

PRESIDENT CHRISTISON: If there are no further remarks, a motion to adopt this report is in order.

DR. A. G. CHADBOURN (Heron Lake): I move its adoption.

DR. ARMSTRONG: I second the motion.

PRESIDENT CHRISTISON: Unless the Chair hears objection, this motion will be declared carried.

Next is the report of the Committee on State Health Relations. I believe you have a resolution on that, Dr. Wright.

DR. WRIGHT: Dr. Sweetser has it.

Dr. T. H. Sweetser read the report of the Committee on State Health Relations.

REPORT OF THE COMMITTEE ON STATE HEALTH RELATIONS

Several meetings of all or parts of the committee have been held; members of the committee have established contacts with various official health organizations of the state, and a study of conditions in different parts of the state has been carried forward by members of the committee residing in the different localities.

A proposal made last year that all agencies doing public health work in Minnesota should be placed under the State Board of Health was studied further and has been laid on the table indefinitely.

The chairman and some of the members of the committee have attended the quarterly meetings of the State Board of Health and have conferred repeatedly with those in charge of the Board of Health work. The work of the division of child hygiene in particular has been studied. A questionnaire was sent to the secretaries of the various county and district societies; answers have been received from a fair number but not all of them.

Finding that in some parts of the state the organized medical profession is rather out of touch with the various official and unofficial health agencies and that in some places there is adverse criticism of some of the work of some of the health agencies, the committee has advised each county and district society to appoint a public welfare committee to maintain contact with and influence policies of local health agencies. We find that some of the societies already have such a committee and are apparently well satisfied with the arrangement. In some districts the contact is maintained through individual doctors, sometimes to the satisfaction of all concerned; in some districts there appears to be no definite contact. We feel that some of the difficulties of the past have been based simply on lack of contact between the doctors and the public health agencies, resulting in misunderstanding and consequent friction.

The general problem of payment of local doctors for public health work is being studied by a sub-committee.

With the approval of the Council of the State Medical Association and of the State Board of Health, the committee is undertaking to publish in MINNESOTA MEDICINE such extracts from the minutes of the quarterly meetings of the State Board of Health as may be of interest to the medical profession, securing, of course, the approval of the officers of the State Medical Association and the President and Executive-Secretary of the Board of Health.

At a meeting in February, the committee listened to and took part in a discussion of the national maternal and infant hygiene act (Sheppard-Towner). The matter was referred to the Council with the note the committee did not favor further extension of the national Sheppard-Towner act. This note was based on a feeling that the subject was not one which should be handled permanently on a national basis by the method of "matching of funds," but should be handled by each state as it might see fit to do. No opposition was voiced regarding the work in Minnesota under the State Board of Health, as it is recognized that the Board of Health has attempted to carry on the work in coöperation with the recognized medical profession. There have been misunderstandings and errors, but where definite contact with the medical profession has been established, the feeling has usually been cordial. The American Medical Association voiced its disapproval of a national Sheppard-Towner act some years ago, but apparently no action has been taken by the State Association.

DR. T. H. SWEETSER: A resolution has been adopted by the Committee on State Health Relations. I should like to have the House of Delegates approve this resolution:

"Whereas, the replies to a questionnaire sent to all health officers in Minnesota by the Minnesota State Sanitary Conference show that rates of pay for health work now and for many years past have no uniformity and apparently no common basis such as the population served, the character of the work required, the

conditions of service, etc., and that the rates in general are unsatisfactory;

"THEREFORE BE IT RESOLVED, That the House of Delegates of the Minnesota State Medical Association recommend that each and every county or district medical society consider the situation and the conditions in their respective areas for the purpose of drawing up a scale of satisfactory minimum fees for the different items of health work done in their areas, this scale to be observed by all members of the Medical Society."

I might say that this applies to public health work by the local doctors working for the county boards, and so forth, doing throat cultures, putting on quarantines, and that kind of thing.

It has been found in some cases, where newcomers have come into the area, that they have charged ridiculously low fees. After those fees have been charged, the men who have worked there a long time and charged the regular fees have been unable to collect their regular fees. I think a scale of minimum fees would help.

The Committee discussed informally the problem of fees for work in the Veterans' Bureau, but there has been no request for the Committee to take up that matter. They felt that until there was, we would not make any recommendation in that regard.

There has been some confusion in the minds of some members of the Committee as to the function of the members of these committees. We have been thoroughly mixed up with the Committee on Public Health Education and, recognizing the need of coöperation in these matters, Dr. Earl is now a member of our Committee, and I am a member of his committee so that we can work together. We also work in coöperation with the Legislative Committee.

There is one other recommendation we should like to make, and that is that the House of Delegates officially request the Minnesota Board of Health to prepare and distribute placards advocating immunization of children against diphtheria by the family physician within the first eighteen months. I understand they are preparing to distribute such placards to the physicians, as well as to distribute them elsewhere, and it seems to me that moral support from the Medical Association in this matter would be quite proper.

President Christison: Has the Reference Committee anything further to say on this matter?

Dr. Wright: I move the report be adopted. We also move the passage of this resolution, which only means a recommendation to the local society. They take this matter up and appoint a committee to deal with the matter in their district.

The question of placards was mentioned in Dr. Pearce's report. As I remember the Reference Committee's action on that matter, I believe they thought that should be done.

I move the adoption of this report, and the adoption of the resolution and recommendation regarding placards.

Dr. W. A. Coventry: I second the motion.

The motion was put to a vote and carried.

President Christison: I am sure you will all be interested to know that in spite of the fact that this is nothing but a Ramsey County Medical Society meeting today, as far as the reading of papers and presentation of cases is concerned, up to date the total registration is 512. (Applause.)

The next report is that of the Heart Committee, Dr. Hirschboeck of Duluth.

Dr. F. J. Hirschboeck of Duluth read the report of the Heart Committee.

HEART COMMITTEE

The Heart Committee, whose appointment was authorized by you, has been formulating plans for the conduct of its working program.

Committees of a similar nature have been working actively in most of the States of the Union, and it is hoped by the Committee that its work will be encouraged by the medical personnel of the State, so that Minnesota may maintain the important position it holds in health matters in this country.

The Committee realizes that it is unwise during the early period of its existence to develop its lines of efforts too broadly, and it feels that its primary effort should be along the lines of enlisting the coöperation of the medical profession in the State. The State Committee plans on coöperating with the American Heart Association, but for the present does not wish to affiliate itself with any national, state or county tuberculosis association, or local boards of health, until the work is more definitely established. Publicity campaigns with the laity for the present are to be studiously avoided, and major attention focused on work among the physicians themselves. The plan at present calls for the following:

(1) The establishment of a uniform classification of heart disease, as suggested by the committee on classification appointed by the Heart Committee of the New York Tuberculosis and Health Association, in this State should be one of the first considerations in developing a uniformity of understanding in the profession.

(2) Based on this classification, mortality statistics for the next few years, showing the death rate from heart, vascular and kidney diseases, by age and sex groups, should be more carefully studied and more suitably classified, so that working data may be procured.

(3) The incidence of preventive cardiac diseases, namely, those induced by rheumatic fever and syphilis, and the relationship between heredity and hypertension should be ascertained. In order to procure data necessary for this statistical study, the profession should be provided with handbooks giving the classification of heart disease as codified.

(4) It is planned that the aid of the county medical societies be enlisted in devoting one program each year to the study of heart disease, and that symposia of of heart disease be added to the larger programs when practicable.

(5) Graduate instruction may be obtained through the University Extension Course, and a list of lectur-

ers, not members of the Heart Committee, will be sent to the secretaries of the county societies, so that competent lecturers may be selected.

(6) An editorial or series of editorials is to appear in MINNESOTA MEDICINE, under the name of the Heart Committee, for the purpose of enlisting interest in the profession in this State.

(7) Through the courtesy of Dr. Willius, of the Mayo Clinic, a scientific exhibit is to be shown at the State Meeting, under the personal charge of the secretary of the Committee, which will endeavor to present various features before the profession.

We feel that this effort at bringing about a closer understanding in the profession of the problems involved should be the first step in the work of the Committee, to be followed subsequently by efforts along other channels as the occasion demands.

F. J. HIRSCHBOECK, Chairman.

PRESIDENT CHRISTISON: You have heard the report of this Committee. Dr. Wright, has the Reference Committee any comments?

DR. WRIGHT: The Reference Committee wishes to commend this report and the policies of the Heart Committee. I move this report be adopted.

The motion was regularly seconded, was put to a vote and carried.

PRESIDENT CHRISTISON: Next is the report of the Committee on Military Affairs, Dr. Ralph T. Knight of Minneapolis.

Dr. Knight presented the report of the Committee on Military Affairs.

REPORT OF THE COMMITTEE ON MILITARY AFFAIRS

This committee has not been called upon during the last year to carry on any active work. The chairman of the committee, however, was asked to help the Historical committee by gathering all possible facts regarding the parts which have been played by Minnesota medical men in military affairs and in military medicine, and the committee is at work on this.

Respectfully submitted,
RALPH T. KNIGHT, Chairman.

DR. WRIGHT: I move the adoption of this report.

The motion was regularly seconded, was put to a vote and carried.

PRESIDENT CHRISTISON: Next is the report of the Historical Committee, Dr. Hamilton of Minneapolis.

Dr. A. S. Hamilton read the report of the Historical Committee.

REPORT OF THE HISTORICAL COMMITTEE

In our report of June 11, 1928, a statement was made of the headings under which the history was being prepared. Further experience has caused us to doubt the wisdom of some of the headings chosen and some of the chapters will certainly be elided.

Early in its experience, also, the Committee decided not to employ anyone to look up the records for us. It was the feeling of the Committee that it would be extremely expensive to hire anyone to undertake this work, and, in the end, would probably not produce the information that we desired and we felt it better to leave to each man to pursue his investigations as a labor of love.

Several of our chapters are now fairly well in hand but there is still a tremendous amount of reading to be done and the Committee sees no immediate prospects of being able to submit the cost of final publication beyond the fact that the work will be kept within the limit that the society is willing to pay for.

The Committee has requested and has been granted an opportunity to present our troubles to the society on Wednesday afternoon at 1:00 o'clock.

Respectfully submitted,
ARTHUR S. HAMILTON, Chairman.

DR. A. S. HAMILTON: I don't know anyone on the Committee who knows anything about the publication unless it is Dr. Scherer. He doesn't feel our work is in that state where we can consult publishers. We don't know very much about the extent of it. Some of the men write these articles at considerable length, and others much shorter. A good many County Society histories have not been sent us at all, but I suppose in the end we will be able to get something concerning all of them.

The Committee will keep its work within the limits which the Society cares to pay for. It will be very much easier to cut down our publication than to pad it if we had pages that would otherwise be empty.

PRESIDENT CHRISTISON: Dr. Wright, have you anything to add?

DR. WRIGHT: I wish to move the adoption of this report.

If I might say so, I sat in with this Committee once or twice this year, and I want to congratulate the Society on having a group of men of the profession in Minnesota who are willing to spend their time on this historical work, men like Dr. Armstrong, Dr. Hamilton and Dr. Dart.

I move its adoption.

The motion was regularly seconded.

PRESIDENT CHRISTISON: Certainly this Committee is to be commended for their activity. I know of nothing which will add more to the dignity of this Society than a complete history of some of the older men that I personally have known.

Yesterday afternoon, at the request of Dr. Workman, I took it upon myself as President of this Society to go out to the Soldiers' Home, and I brought Dr. Brewer Mattocks into St. Paul who, so far as I am able to find out, is the only surviving charter member of this Association. He is a man eighty-eight years of age, and his only infirmity is that he can't see. He was with us for a while this afternoon, and you shall all have the privilege of seeing him at the banquet tomorrow night.

The motion was put to a vote and carried.

PRESIDENT CHRISTISON: At this junction, I would ask Dr. Boleyn, the Chairman of the Credentials Committee, if he has any supplementary remarks to make.

DR. BOLEYN: There were forty-seven accredited delegates. A few have come in since, making the total 54.

PRESIDENT CHRISTISON: The Committee on Univer-

sity Relations. We will ask Dr. Wright to make this report.

Dr. Wright read the report of the Committee on University Relations.

REPORT OF THE UNIVERSITY RELATIONS COMMITTEE

The University Relations Committee has held two meetings in 1928. The first of these meetings was attended by Dr. W. J. Mayo, representing the Board of Regents; Dr. E. P. Lyon; Mr. Paul Fesler, Superintendent of the University Hospital; Dr. C. C. Kennedy, and Dr. C. B. Wright, Dr. H. H. Workman, Dr. H. M. Johnson, and Dr. W. F. Braasch could not be present.

At this meeting, which was requested by the Dean of the Medical School, the needs and the policies of the University Hospital were discussed. The question of raising the per diem rate, which at present is $3.00 and does not cover the cost of hospitalization, was taken up. The superintendent of the University Hospital stated that this rate would have to be increased to $3.75 per diem in order to maintain its cost. Although no action was taken, this seemed to be a reasonable request by those present.

The question of separating the University Hospital budget from that of the General University budget was also discussed. The superintendent of the Hospital felt that the hospital was performing the function of a State Hospital as well as being used for teaching purposes, and that the cost for hospitalization should be separated from the Medical School budget. He also feels that it is imperative for the Hospital to know the exact amount to be appropriated so that it could be planned in advance how many beds to fill. In the past there has been some misunderstanding in the minds of those concerned regarding the University Hospital budget.

The second meeting of this committee was called at the request of the President of the University, Dr. L. D. Coffman, to discuss the Medical School needs and appropriations. Those present were President L. D. Coffman, Dean E. P. Lyon, Dr. H. M. Johnson, Dr. W. F. Braasch, Dr. C. C. Kennedy, and Dr. C. B. Wright. President Coffman outlined the budget of the University and, again, Mr. Fesler presented his ideas in regard to the two questions of University Hospital needs. The discussions were entirely informal, no action being taken nor requested.

Respectfully submitted,
C. B. Wright, Chairman.

President Christison: You have heard the report of the Committee on University Relations. What is your pleasure?

Dr. Boleyn: I move its adoption.

The motion was regularly seconded.

President Christison: Has anyone any suggestions to make regarding the recommendations therein?

The motion was put to a vote and carried.

President Christison: The next report is that of the Delegate to the American Medical Association, Dr. Litzenberg of Minneapolis.

Dr. Litzenberg read the report of the Delegate to the American Medical Association.

REPORT OF THE DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION

Your delegates to the House of Delegates of the American Medical Association beg leave to submit the following report of the meeting at Minneapolis, June 11 to 15, 1928:

The proceedings of the House of Delegates have already been published in the Journal of the American Medical Association, so we will limit this report to a few features of the deliberation of the House:

THE SOCIALIZATION OF MEDICINE

One of the outstanding considerations was the subject of the socialization of medicine, which was attacked by the speaker of the House of Delegates, the President and by various other officers and committees. The speaker of the House, Dr. F. C. Warnshuis, in his annual address touched upon this subject in the following words: "The leaders in every field of our cosmic life are influenced and guided by our pronouncements and conclusions. Conscious of this position, we dare not fail to justify and maintain a national confidence, nor dare we neglect acquainting ourselves of the responsibilities which the health problems of the nation demand and which the public expect us to guide and direct. Impinging as they do on every avenue of life, it is our solemn duty and trust to institute the good and defeat the bad measures. We are morally obligated to combat the trend toward the socialization of medicine in all its multiplied and surreptitious forms, so too are we morally obligated to submit measures that will nullify representations made as reasons for sponsoring and promulgating varied forms of socialized medical supervision of individual and county health."

Also the President of the Association, in his address to the House said: "Out of a broad spirit of charity and generosity on the part of the medical profession has come a most vital problem. I refer to the increasing dangers aof the abuse of medical charity. There is not a single hospital or clinic, offering free services, that could continue for a month without the free and generous service from doctor or staff of doctors. The grocer does not give his produce without price, nor does the plumber install the pipe for generous pleasure, and the milkman is quite careful of his measure. Have we then not a right, therefore, to insist, that our free services be limited to those worthy of charity."

"I feel that the time has come when no institution should permit the attending physicians to be imposed upon or contribute to what is a gross injustice to the profession as a whole. I therefore desire to recommend for your consideration the creation of some sort of an agency, perhaps the Judicial Council, within our Association, to meet this problem. The first duty of such an agency should be to investigate all medical charities and to formulate rules, determining what shall constitute proper medical charity. Similar councils should be recommended to the various state societies

and to their component societies for direction of efforts in their respective fields.

"The medical profession owes fair and competent service to the people, but the public also owes fair treatment to the practitioner."

The House of Delegates commends the "speaker's anxiety concerning the potential domination of the general field of medicine by lay organizations with socializing tendencies." It also commended the address of the President and "his protest against the exploitation of physicians in the abuse of medical charity" and his declaration "that the time has come when no institution should permit its attending physician to be imposed upon or contribute to what is a gross injustice to the profession as a whole."

The House also approved the "Principle of the President's recommendation for the investigation of medical charities, through the Judicial Council."

The Council on Medical education also urged that "the practice of medicine is not the proper function of corporations and that the American Medical Association should use its utmost endeavors to stop this growing abuse."

CLINICAL LECTURES

An innovation is the establishment of a clinical lecture program by prominent men, preceeding the regular scientific program.

THE RURAL MEDICAL SITUATION

The Council on Medical Education expressed the opinion "that the difficulties of rural communities in regard to medical service are not as great as they have been painted."

"The problem is fundamentally economic and the solution involves much more than the mere length and costs of medical education. Patience and time are necessary to obtain data and involve methods of solving the problem."

CULTS

The gratifying report by the Council on Medical education is made that cults are diminishing, both in number of schools and in students.

MEDICAL EDUCATION

It is interesting to note in the report of the Council on Medical education that of the 20,093 applicants for entrance into medical schools, many were duplicates and that there were only 8,500 actual individual applicants. Of these 8,500 applicants 6,420 were received. Of the 2,000 rejections, most are believed to be not properly prepared.

The House adopted the following resolutions:

1. That medical students should graduate and enter practice at an earlier age.
2. That covering the medical course in three years, of four quarters each, instead of in four years of three quarters, with a long vacation is recommended.
3. That the medical course is overcrowded with detailed consideration of the specialties and would be improved by less crowded courses, confined more nearly to the essentials and to the fundamentals.

AMENDMENTS TO THE CONSTITUTION AND BY-LAWS

The House adopted the following amendments:

An amendment to the constitution, presented by George E. Follansbee of Ohio, was changed by the House to an amendment of the By-Laws, as follows:

Section 12, Chapter XI to the By-Laws.

Section 12. "The House of Delegates shall have power to discipline or expel a member of the American Medical Association, or Fellow of the Scientific Assembly on recommendation of the Judicial Council." The effect of this amendment will be to permit the House of Delegates to exercise the authority of disciplining or expelling a member heretofore held only by constitutent county or district societies.

An amendment to Article 12 of the Constitution, offered by J. C. Litzenberg of Minnesota, requiring a three-fifths vote of the delegates registered to amend the constitution, was adopted after changing "three-fifths" to "two-thirds."

The effect of this amendment will be to facilitate rather than interfere with necessary amendments to the constitution.

The amendment proposed by J. C. Litzenberg of Minnesota to change a quorum from twenty delegates to a majority of the delegates registered, was amended to "fifty delegates shall constitute a quorum." The effect of this amendment will be to prevent small minority control of the House of Delegates.

MULTIPLICITY OF SOCIETIES

The House of Delegates expressed its approval of the suggestion of the President and of the Secretary that "there exists in the multiplicity of medical societies a danger of diverting and dissipating the fundamental and legitimate strength of organized medicine as tipified in the composition of our county, state and national organizations. The House "especially deprecates the compulsory multiple scientific meetings of hospital staff organizations and suggested that such staff meetings be devoted preferably to discussions of problems of hospital economics and records."

MOTION PICTURES

The House adopted a resolution "That a committee on visual moving picture education be appointed to bring the ethical moving picture films within the authority and approval of organized medicine."

REAPPORTIONMENT OF DELEGATES

The present House consists of 170 delegates, one for each 750 members of the American Medical Association. Reapportionment will be necessary next year to keep the House within the constitutional limitation of 175 delegates. It is proposed to change the apportionment to one delegate for each 775 or 800 members. The number of delegates from Minnesota, which is three, will not be changed by the proposal. At the last reapportionment Minnesota gained one delegate.

Only eleven states have more than three delegates. Under discussion of this subject and the attendance of delegates on motion of A. E. Bulson of Indiana, the House voted to publish the list of attendance of delegates for the benefit of constituents back home." May we say, in this connection, that all three of the Minnesota delegates attended every meeting of the House. From other states there was a total of fourteen absent delegates.

OFFICERS

The officers elected were:

President Elect—Dr. Malcom L. Harris of Illinois.

Vice President—Dr. Wm. A. Jones of Minnesota.

Secretary—Dr. Olin West of Kentucky.

Treasurer—Dr. Austin A. Hayden of Illinois.

Speakers of the House of Delegates, Dr. Frederick C. Warnshuis of Michigan; Vice Speaker of the House of Delegates, Dr. Allen H. Bunce of Georgia.

Among the five honored by election as Affiliate Fellows was Dr. J. W. Andrews of Mankato, Minnesota.

Portland, Oregon was selected as the place of the next meeting.

Respectfully submitted,
J. L. Rothrock,
W. L. Burnap,
J. C. Litzenberg.

Dr. J. C. Litzenberg (Minneapolis): At the meeting in Duluth, I advocated that the expenses of the delegates to the American Medical Association be paid by this Society. Before doing so, I refused election as a delegate to the House of Delegates of the American Medical Association. You didn't listen to my refusal and elected me a delegate for the next two years, and immediately adjourned not giving me an opportunity to protest.

Therefore, with your permission, I should like to read the following.

Dr. Litzenberg read his supplemental statement.

House of Delegates,
Minnesota State Medical Association.

When I presented my recommendation in the report at the Duluth Meeting that the expenses of the Delegates to the House of Delegates of the American Medical Association be paid by the State Association, I was quite sincere in that recommendation and refused on account of my recommendation re-election as a Delegate.

The House adopted the recommendation that the expenses of the Delegates be paid but in spite of my refusal of re-election, the House did re-elect me and adjourned immediately so that I had no opportunity to protest.

Inasmuch as the Meeting of the American Medical Association was held in my home city and therefore no expense was placed upon the State Association, I served as Delegate at the Minneapolis session.

Inasmuch as the remaining year of my Delegateship would be an expense to the Association and wishing to be consistent, I herewith present my resignation as Delegate from this Society to the American Medical Association.

I appreciate the honor that you have repeatedly conferred upon me.

Respectfully submitted,
J. C. Litzenberg.

President Christison: Dr. Wright, have you anything to add to Dr. Litzenberg's report?

Dr. Wright: This report has not been submitted to us, and therefore we have no recommendation.

I move the adoption of the report, however. The question of Dr. Litzenberg's resignation should be taken up separately.

Dr. Armstrong: I move that consideration of this report be delayed until the next session to give the Committee a chance to make a recommendation.

President Christison: There are two motions before the House, neither of which have been seconded.

Dr. Armstrong: Will you accept that as an amendment?

Dr. Braasch: It seems to me that the Committee report was a very excellent one, and leaves nothing for discussion.

The matter of the resignation is an entirely different matter and secondary to his report. I am informed that the House of Delegates can take no action on his resignation.

Dr. Armstrong: It seems to me to be an outrage that this Society will not pay the expense of the delegate to the American Medical Association.

Secretary Meyerding: The Society does pay the expenses.

Dr. Armstrong: I beg your pardon.

President Christison: Dr. Litzenberg explained that he wanted to be consistent and that, therefore, he desired to tender his resignation.

The motion to accept the report was seconded, was put to a vote and carried.

President Christison: With respect to Dr. Litzenberg's resignation, that is another matter entirely. It is perfectly easy for Dr. Litzenberg to resign as a delegate from this Association to the American Medical Association, but it may be a little difficult for him to get it accepted.

Dr. Litzenberg has offered no explanation other than his desire to be consistent. Those of us who know Dr. Litzenberg very well are quite loath to put a motion of this sort. Personally, I am. We have to keep in mind the fact, too, that the delegate has an alternate, and if he, himself, cannot go then the alternate is supposed to take his place.

If I might be permitted to express my opinion without burdening you, I don't like the idea of changing the delegates to the American Medical Association very frequently. At various times I have sat in the House of Delegates as a representative of the Pediatric Section, and I know something about the workings of that House. I certainly don't quite like the idea of frequent changes.

However, Dr. Litzenberg's resignation is before us and, willingly or otherwise, I will have to ask you what you are going to do with it.

Dr. Braasch: Dr. Litzenberg can't resign. Dr. Fishbein has been good enough to inform me that legally

he can't do so. All he can do is to stay away and the alternate can take his place. He cannot resign as far as the present meeting is concerned. His term of office expires January 1, 1930. If he does not go to the ensuing meeting his alternate will take his place legally.

DR. W. A. COVENTRY: I move that the resignation of Dr. Litzenberg be placed on the table indefinitely.

The motion was regularly seconded.

PRESIDENT CHRISTISON: This is a point in parliamentary procedure with which I am not familiar. Dr. Fishbein says he can't resign, and I don't see what we can do about it. However, in order to double lock the door, I will ask you if you have any remarks to make concerning Dr. Coventry's motion?

DR. W. H. CONDIT (Minneapolis): I can inform you that that word "consistent" meant quite a bit. If Dr. Litzenberg is alive and able he will be at the meeting in Portland. If he cannot resign he is bound to be our official agent at that meeting.

DR. FISHBEIN: A motion to table is not debatable. It has to be put at once without debate.

The motion to table was put to a vote and carried.

PRESIDENT CHRISTISON: Dr. Meyerding says Dr. J. M. Hayes of Minneapolis has a resolution he desires to present.

DR. J. M. HAYES (Minneapolis): This resolution was drawn up by the Sub-Committee of the Public Health Committee of Hennepin County Medical Society, and they asked me to present it.

Dr. Hayes read the resolution.

RESOLUTION TO BE INTRODUCED IN THE HOUSE OF DELEGATES OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Whereas, numerous poorly trained and unqualified persons are being graduated from institutions of questionable repute and are being employed to do *x*-ray and clinical laboratory technic, and whereas, the average physician is not in a position to judge as to the qualifications of the persons applying for such positions, and whereas it seems fitting and proper that the Minnesota State Medical Association shall take upon itself the duty of indicating to its members whether or not such technicians are properly qualified.

Be It Resolved:

1. That the Committee on Hospitals and Education of the Minnesota State Medical Association be instructed to create a Board of Examiners in medical technology for the purpose of awarding certificates of merit to properly qualified *x*-ray and clinical laboratory technicians.

2. This Examining Board is to determine the minimal qualifications and training for *x*-ray and clinical laboratory technicians and to award certificates only to such technicians as are so qualified and so trained.

3. The possession of a certificate awarded by this Board shall be evidence of the proper qualifications of the individual for doing *x*-ray or clinical laboratory technical work.

4. That the Secretary of the Association be instructed to circulate information as to this certificate to the physicians and hospitals of the State so that they will be fully informed of this procedure.

5. That the members of the Association be urged through the usual publicity channels not to employ *x*-ray or clinical laboratory technicians who do not possess such a certificate.

By resolution of the Committee on Public Welfare of the Hennepin County Medical Society.

By (Signed) LEO G. RIGLER, M.D.
CHARLES R. DRAKE, M.D.

PRESIDENT CHRISTISON: You have heard Dr. Hayes' resolution. What is your pleasure?

DR. HAYES: The thing that led to this resolution was a bill introduced in the legislature this last session attempting to regulate the qualifications of these technicians, but the bill could not be put through on account of many technicalities.

This Committee, knowing that there are two or three schools in the state which are advertising courses to prepare these technicians to do first-class work, and finding that they are not qualified to give that preparation, wished to inform the physicians in hospitals throughout the state of the fact that these schools are not in position to prepare technicians. It was for that reason that a Committee was formed to draw up this resolution.

PRESIDENT CHRISTISON: Dr. Hayes, you will have to move a resolution to adopt the report.

DR. HAYES: I so move.

The motion was regularly seconded.

PRESIDENT CHRISTISON: Dr. Wright, as Chairman of the Reference Committee have you anything to add?

DR. WRIGHT: The Reference Committee have considered this report, and it seems to be a pretty definitely recognized fact that there is a real necessity for someone to interest himself in the situation because of the various kinds of technicians that are being educated.

After considerable deliberation, we made the following recommendation, which I move, that the Council be empowered to appoint a Committee on medical technology to pass on the qualifications of medical technicians, and on request to grant a certificate of merit to such technicians who in their opinion are properly qualified.

DR. ARMSTRONG: I think the American Medical Association took this matter up. Dr. Fishbein, didn't you have a committee investigating some school of technology here?

DR. FISHBEIN: That is a thing fully covered by the action of the American Medical Association which regularly inspects all laboratories, *x*-ray and others, and which has definite specifications drawn up for what shall constitute an acceptable laboratory. Of course, that would include the training of people in that laboratory.

We have a regular group of inspectors who go around inspecting all laboratories which endeavor to do work for physicians, either *x*-ray, biological, chemical, or the laboratories of hospitals. Such laboratories are not approved unless under the ownership or direction of a regularly licensed physician in good standing, and

of course he should take the responsibility for the kind of men he turns out.

I can conceive of a considerable danger in attempting to set up a committee which will grant certificates which would really represent an endorsement by the organized medical profession of non-medical men. These men could then go out and use these certificates and set themselves up in all sorts of work, and you would have a hard time taking away a certificate that you once granted to such a man. You have no means of punishing them. You can always suspend a man in the County Medical Society. If you give a non-medical man a certificate in your organization he can give you anything he wishes and show you a certificate that you once thought he was a very good man. You have no means of penalizing him for a wrong action after you once let him in.

The ideal thing you can do, if you have any doubts as to its ability to train technicians, is to ask the Council of Medical Education and Hospitals of the American Medical Association to investigate that institution and publish a report. That report would serve as a warning against that institution. I should think that would be a nearer way to get at what you are trying to accomplish.

Dr. Armstrong: I wanted to bring that out. In the Ramsey County Medical Society we have a local committee which approves certain laboratories in St. Paul, or disapproves of them. I just wanted to bring out the point Dr. Fishbein has made.

Dr. Coventry: Mr. President, it doesn't seem to me that a committee appointed by the Council would really have power to issue certificates of merit, as you might call them, or certificates of qualification. You might have a committee to investigate the different laboratories in the state and set a standard of what you might expect. In the course of a year they could probably get all their work together and establish minimum standards, and recommend certain places where the work should be done.

Let the committee go out and free-handedly establish who shall or shall not get a certificate, and you would have a tremendous lot of responsibility which would lead anywhere from down the alley to somebody hitting us on top of the head.

Dr. Kelly: It seems to me that this resolution and anything favorable toward it is yielding to the great American habit of law making and resolution passing.

To a fellow from the sticks, it would seem that there are already sufficient agencies in number and capacity for training, and sufficiently recognized as to establish where such training can be had. Those institutions are well known to the profession at large.

If an amendment is permissible at this time, I should like to amend the resolution to adopt to the effect that this resolution be laid upon the table.

Dr. Wright: May I defend that resolution just a moment?

We are all familiar with the efforts of the American Medical Association, but they have not done anything at all to curb this thing in this state. We have two schools in Minneapolis that are charging high school students $200 or $300 for a course which gives them nothing. They are going around through the state advertising and talking before high schools, even in the city of Rochester. I believe we should do something about it.

I think it is up to us to do something to help the legitimate places that are trying to get recognition, and trying to eliminate the unfit. I don't believe we can high-hat the people who are trying their best to clean up the profession. They came to the Legislative Committee with a strong lobby behind it, let me tell you, to put over a technicians' board. We don't want another board in this state. If you establish a board for technicians in this state, you are going to have a group who are going to call themselves doctors, and we will have no control over them at all. This idea was merely to work with these people to a certain extent.

I am sure that with men on the committee like Dr. O'Brien they would do nothing that you or I would be ashamed of. They would give us a certificate or letter of commendation. It may not be a good thing to do; I can see that clearly. But I do think this should go to the Council and this committee should be appointed.

Dr. Fishbein: I should like to say that I agree absolutely with Dr. Wright's point of view that the machinery should be made adequate to control the situation. If the machinery does not now control the situation new machinery should be developed.

Our only weapon in such a case is publicity. We would investigate such schools on request from Hennepin County, and having made an investigation we would publish the report. That report could very well be circulated by the Society, or in some other manner be brought to the attention of people in high schools so that their graduates would not be led into these schools.

Of course, there should also be some portion of your state law which would definitely control the chartering of schools of this type. In many states it is impossible to charter a school and teach a professional branch of this sort without having certain minimum regulations.

I would favor the appointment of a committee to study the particular local situation and find out some means of remedying it, but I do feel that the appointment of a committee to conduct examinations and grant certificates, when such a committee has no legal status whatever in the state, is rather a difficult and dangerous procedure.

Dr. A. G. Schulze: I think we are getting down to the practical issue involved now.

I was amused at the original report where he said there were a couple of institutions in the Northwest. That may be true if Minneapolis is the whole Northwest. These institutions are causing considerable trouble.

As Secretary of the Ramsey County Medical Society, you may be surprised at the letters I receive from prospective students. They don't come from young

women in Minnesota. They come from California and Maine.

A woman recently came to me and said, "I have paid half of my tuition in one of those institutions, and I understand the institution isn't what it claims to be. What shall I do?"

There are several members of the Ramsey County Medical Society who are identified with these institutions. One man is either going to resign or sever his connections with his medical society.

I have in my files reports of several members giving the result of their investigation, but the fact remains that they are still going on as they have been.

It is a practical question. Shall we allow these people to be humbugged? Hasn't the time come when we should take a definite step?

DR. ARMSTRONG: I was connected with this Northwest Institute of Medical Technology at one time, but I resigned some years ago. At that time it was run by a regular physician who was a man of ethical standing. It has since passed into the hands of a man who is not a physician at all. I resigned some years ago, and I am glad to say I was not connected with it when the American Medical Association investigated it.

I gave a lecture on how to handle or sterilize urethral instruments. At one time Dr. Christison and a number of others were connected with it.

After I resigned I received letters which they sent out themselves. For instance, they mailed a letter which ostensibly came from a girl in Indiana asking what I knew about the institution, and what I thought about her taking a course and paying the money for it. I was going to answer it and say I didn't think the thing was any good when the thought struck me that they were looking to see what I was going to say, and I might get in trouble. I made a very noncommittal reply which rather discouraged the writer. That letter was not sent to me by any individual. It was a letter they had written themselves and had sent from Indiana, and of course they got my reply.

DR. WRIGHT: I should be glad to amend the resolution to say that a committee be appointed to investigate this; a Committee on Medical Technology, if that is acceptable.

The motion was regularly seconded.

DR. COVENTRY: Wouldn't it be better to say investigate and recommend to the Society next year?

DR. WRIGHT: That is all right.

The amendment was put to a vote and carried.

PRESIDENT CHRISTISON: We will now vote on the original resolution as amended.

The original resolution as amended was put to a vote and carried.

PRESIDENT CHRISTISON: Dr. Wright, have you anything further to add as Chairman of the Reference Committee?

DR. WRIGHT: There are several things that have been referred to us.

Here is an amendment to the By-laws which amends Chapter IX, Section 9.

Dr. Wright read the amendment to the By-laws.

Resolved that the By-Laws be amended to read:

Chapter IX—COMMITTEES

Section 9. The Committee on State Health Relations shall consist of as many members as the council may determine, its function to be, first, to study relation of the activities of the various State or Governmental Agencies and their relation to the practice of medicine; second, to coöperate with these various State or Governmental Agencies whose function is the promotion of public health.

DR. WRIGHT: This is just making legal a committee which has been operating for some time. I move its adoption.

The motion was regularly seconded.

PRESIDENT CHRISTISON: That motion will be taken up at our meeting tomorrow.

Secretary Meyerding has amendments to the Constitution.

Secretary Meyerding read the amendments to the Constitution.

AMENDMENTS TO THE CONSTITUTION

Article XIII of the Constitution of the Minnesota State Medical Association reads as follows:

"The House of Delegates may amend any article of this Constitution by a two-thirds vote of the Delegates present at any Annual Session, provided that such amendment shall have been presented in open meeting at a previous session, and that it shall have been published twice during the year in the bulletin or journal of this Association, and sent officially to each component society at least two months before the meeting at which final action is to be taken."

The following amendments have been presented in open session and have been published twice in MINNESOTA MEDICINE.

Article IV—Composition of the Association.

Sec. 1. This association shall consist of Members, Delegates, Affiliate Members, Honorary Members, Associate Members and Guests.

Sec. 4. Affiliate Members. Affiliate members shall be those members of component district or county medical societies, who have held such membership for a period of 25 years, and have reached the age of 65 years, or, through physical disability, are unable to engage in active practice, and who, upon their own request to their district or county society, shall have been declared Affiliate Members of such district or county societies.

Sec. 5. Honorary and Associate Members. Honorary and Associate members shall be those elected to such membership by the House of Delegates on recommendation of the Council.

It was regularly moved, seconded and carried to adopt the amendments.

Secretary Meyerding presented a resolution to elect Dr. D. C. Lochead honorary member of the Society.

Dr. Chadbourn: I move the adoption of that resolution.

The motion was regularly seconded.

President Christison: This resolution has been moved and seconded. If there is no objection, it will be so ordered.

Has anybody any new business?

When shall this organization meet again?

Secretary Meyerding: We shall meet downstairs tomorrow at twelve-thirty. The tables will be all set so that we won't miss any more of the program than is necessary. It has been customary to give the delegates a chance to attend the scientific sessions.

Dr. Workman: The Council will meet immediately.

President Christison: A motion to adjourn until tomorrow at twelve-thirty is in order.

Motion to adjourn was regularly made, seconded and carried.

The meeting adjourned at six o'clock.

SECOND MEETING OF THE HOUSE OF DELEGATES

May 14, 1929—12:30

The second meeting of the House of Delegates of the Minnesota State Medical Association, held in the Scottish Rites Dining Room of the Masonic Temple, St. Paul, Minnesota, convened at 12:30 o'clock, Dr. J. T. Christison, President of the Association, presiding.

President Christison: The meeting of the House of Delegates will come to order.

Is the chairman of the Credentials Committee ready to report?

Dr. Boleyn: There were 55 accredited members. I would like to suggest that the Secretary be instructed to call the roll.

Secretary Meyerding: The Credentials Committee report 55 Delegates accredited. We want to announce that the Canti Cancer film will be put on immediately after we eat. We will run the film on this wall here after we adjourn. Those who care to see it may remain. The Credentials Committee report that they want the roll called.

Roll call by the Secretary. There were 36 accredited members present.

Secretary Meyerding: Is there a Delegate here whose name was not called and who is accredited? I read only those names that are accredited by the Credentials Committee, and if there is anyone else here who has come as a Delegate, he should turn over his credentials to the Credentials Committee.

President Christison: The next order of business is a summary of the Minutes of yesterday's meeting. The Secretary will now read it.

Summary read by Secretary.

President Christison: If there are no corrections, the Minutes will stand approved. You all know perfectly well that these Minutes will be published a little later and then if there are any errors or omissions noted, it is up to you as members of the House of Delegates to notify the Secretary.

Dr. F. C. Schuldt (St. Paul): Did you read about Dr. Litzenberg's resignation?

Secretary Meyerding: This is just a summary of important business and that was not important because we could not do anything about it.

President Christison: Gentlemen, the time has now arrived for the election of officers for the ensuing year. The Chair will appoint as tellers Dr. W. H. Hengstler, Dr. J. M. Hayes, and Dr. A. G. Liedloff. The Chair will now entertain a nomination for President-elect for 1930.

Dr. Magney: I have taken part in a few campaigns, if this may be called such, but this is the most uninteresting and at the same time, most gratifying one I have been in. Uninteresting because there is only one candidate in the field—and gratifying because every person who has been approached is strong for this candidate. Therefore, I nominate Dr. Sam Boyer of Duluth.

Dr. W. A. Jones: I move that the nominations be closed.

President Christison: I don't know whether that nomination was seconded or not, but if there are no further nominations and someone will second it—

Dr. Kelly: I second the motion. I ask the consent of the mover that it be amended so that the Secretary shall cast the unanimous ballot of the House of Delegates for Dr. Boyer as President.

President Christison: If there are no further nominations, we are ready to vote on the motion that the nominations be closed.

The motion was put to a vote and carried.

Secretary Meyerding: The Secretary hereby casts an unanimous ballott for Sam Boyer of Duluth as President for the ensuing year.

President Christison: Gentlemen of the House of Delegates: Nothing in the world gives me more pleasure than to introduce to you the gentleman whom you have elected to preside over the destinies of your Minnesota State Medical Association for the year in grace 1930—Sam Boyer of Duluth.

Dr. S. H. Boyer (Duluth): I don't believe I had better try to make a speech. I am not prepared.

President Christison: We will now have nominations for Vice-president. There are two of them.

Dr. Schuldt: I would like to put a nomination for R. C. Farrish of Sherburn for first Vice-president.

President Christison: I am sorry to have to inform you that while I love Bob very dearly, I am forced to say he is not eligible because of the fact that he is a Delegate.

Dr. R. C. Farrish (Sherburn): I beg your pardon. I think I am not a Delegate to this Convention.

President Christison: I take it all back. I beg your pardon. The name of Dr. R. C. Farrish—Bob, you all know him as Bob—of Sherburn. Are there any further nominations?

Dr. B. S. Adams (Hibbing): I move that the nominations be closed, and that the Secretary cast an unanimous ballot of the House of Delegates for Dr. R. C. Farrish as First Vice-president.

Dr. Workman: I second the motion.

President Christison: It has been moved and seconded that the nominations be closed and the Secretary be instructed to cast the unanimous ballot of the House for Dr. Farrish as First Vice-president.

Secretary Meyerding: The Secretary casts unanimous ballot for Dr. R. C. Farrish as First Vice-president.

Dr. Farrish: Well—I wish merely to express my gratitude and thanks for the position that you have given me. Thank you.

Dr. M. S. Henderson (Rochester): I would like to nominate B. J. Branton as second Vice-president.

President Christison: Are there any further nominations?

Dr. Workman: I move that the nominations be closed and that the Secretary be instructed to cast an unanimous ballot for Dr. Branton as Second Vice-president.

Dr. Boleyn: I second the motion.

Secretary Meyerding: The Secretary cast an unanimous ballot for B. J. Branton of Willmar as Second Vice-president.

President Christison: Dr. Branton has been elected by unanimous vote as Second Vice-president. The next one is that of Secretary. Now, don't all speak at once.

Dr. Kelly: It certainly is a pleasure to move the re-nomination and re-election of our present Secretary. I make that as a motion.

Dr. Boleyn: I second the motion.

President Christison: The Chair will assume that somebody has already made a motion that the President cast the ballot.

Dr. C. P. Robbins (Winona): I move that the nominations be closed and that the President cast the ballot for Dr. Meyerding as Secretary.

President Christison: The President hereby casts an unanimous ballot of this organization for Dr. Meyerding as Secretary.

It is now necessary that we elect a Treasurer to fill the unexpired term of Dr. Hare and also for the year 1930.

Dr. Adams: I nominate Albert Schulze of St. Paul.

Dr. S. H. Baxter (Minneapolis): I move that the nominations be closed and that the Secretary cast a ballot for Dr. Schulze of St. Paul as Treasurer to fill the unexpired term of Dr. Hare.

President Christison: Now what is your pleasure in regard to 1930.

Dr. Baxter: I amend that motion to read that Dr. Schulze be nominated to fill the unexpired term of Dr. Hare and as Treasurer for 1930.

Secretary Meyerding: The Secretary casts an unanimous ballot for Dr. Schulze as Treasurer.

President Christison: There are three Councilors for the 1st, 2nd and 9th Districts whose terms expire with the close of this year: M. S. Henderson, Rochester, is Councilor for the 1st District; L. Sogge of Windom, 2nd District; and W. A. Coventry, Duluth, the 9th District. What is your pleasure with respect to the Councilor of the 1st District?

Dr. A. W. Adson (Rochester): I would like to nominate Dr. Henderson as Councilor of the 1st District.

It was moved and seconded that the nominations be closed.

President Christison: It has been moved and seconded that the nominations be closed and that the Secretary cast the ballot for Dr. Henderson of Rochester for Councilor of the 1st District for a term of three years.

Secretary Meyerding: The Secretary casts an unanimous ballot for Dr. Henderson of Rochester.

President Christison: Now the 2nd District.

Dr. Chadbourn: I nominate L. Sogge of Windom for the next three years.

Dr. W. S. Hitching: (Lakefield): I second the motion.

President Christison: Are there any further nominations? Hearing none, I will ask the Secretary to cast the unanimous ballot of this Association for Dr. Sogge of Windom.

Secretary Meyerding: The Secretary casts an unanimous ballot for Dr. Sogge.

Dr. C. L. Haney (Duluth): I nominate Dr. Coventry of Duluth to succeed himself.

President Christison: Are there any further nominations? Hearing none, I will ask the Secretary to cast the ballot of this Association for Dr. Coventry of Duluth to succeed himself.

Secretary Meyerding: The Secretary casts an unanimous ballot for Dr. Coventry of Duluth.

President Christison: Delegates to the American Medical Association for a term of two years. For the years 1930 and 1931. According to our Constitution, the Council nominates two men—one a Delegate and the other the Alternate. Its nomination for Delegate is C. B. Wright and Alternate is J. T. Christison. I suppose you prefer to vote for each one separately. Any nominations can be made for Delegate. The Council recommended C. B. Wright.

Dr. G. S. Wattam (Warren): I move that the nominations be closed.

Dr. Schuldt: I second the motion.

Secretary Meyerding: The Secretary casts an unanimous ballot for Dr. Wright.

President Christison: Nominations are now in order for Alternate. The Council nominated Dr. J. T.

Christison as Alternate. Are there any further nominations?

Dr. Henderson: I move that the nominations be closed.

The motion was seconded.

Secretary Meyerding: The Secretary casts an unanimous ballot for Dr. Christison.

President Christison: The next order of business is unfinished business. Does anyone care to offer anything under that head?

Secretary Meyerding: There was a By-Law offered yesterday on Committees, Section 9.

"Resolved that the By-Laws be amended to read:

Chapter IX—Committees

Sec. 9. The Committee on State Health Relations shall consist of as many members as the Council may determine, its function to be, first, to study relation of the activities of the various State or Governmental Agencies and their relation to the practice of medicine; second, to coöperate with these various State or Governmental Agencies whose function is the promotion of public health."

Dr. Workman: I move the adoption of the Resolution.

Dr. Kelly: I second the motion.

President Christison: It is an Amendment to the By-Laws, not a Resolution, having been laid over from one meeting to another and can now be adopted if it is your pleasure so to do.

The motion was put to a vote and carried.

President Christison: The next order of business is the determination of the time and place for the next meeting.

Dr. Haney: St. Louis County is very glad to have the State Society meet in Duluth next summer or any time the Council may fix.

President Christison: Will you add to that that the time of the meeting be left to the Council to designate?

Dr. Kelly: I would move that the invitation of Duluth for next year's meeting be accepted and that the time be fixed by the Council.

Motion seconded.

President Christison: The motion has been seconded that the invitation of St. Louis County be accepted and that the time of the meeting be left to the pleasure of the Council.

The motion was put to a vote and carried.

Secretary Meyerding: A Resolution has been offered as follows:

"Much credit for the success of the 61st Annual Meeting of the Minnesota State Medical Association is due to the splendid coöperation and interest shown in the meeting in St. Paul.

"The House of Delegates wishes to especially thank the Ramsey County Medical Society through whose efforts the success of the meeting is largely due; the *Dispatch*, the *Daily News*, and the *Associated Press* for their careful and intelligent handling of the reports; the St. Paul Association for the efficient arrangements for the Open Forum Luncheon; the Masonic Temple and the St. Paul Hotel for the many courtesies rendered."

We would suggest that also a Resolution be authorized to be sent to Ramsey County Medical Society for their wonderful entertainment as hosts.

Dr. Coventry: I move the Resolution be adopted.

Dr. Wattam: I second the motion.

President Christison: I can't see the sense of thanking them for something it is their duty to do. It is what you would expect them to do.

The motion was put to a vote and carried.

President Christison: Inasmuch as our next meeting is to be held in Duluth and that it is incumbent upon me to appoint a Committee to introduce the President-elect to the assembled multitude tomorrow at 10:10, I shall be pleased to appoint Dr. Coventry and Dr. Claude Haney of Duluth to perform that office.

Secretary Meyerding: The Council will meet here immediately after this meeting. We are going to put on the Canti Cancer film immediately. Those who wish to see it may remain.

President Christison: Has anyone anything to offer under the head of new business?

Dr. Workman: This is the Report of the Council. Dr. Coventry read the report of the Committee appointed to study Associate Membership, as follows:

"Your Committee on Honorary and Associate Membership beg leave to report and recommend.

First: That local county medical socities be urged to so re-arrange their Constitutions and By-Laws as regards classification of membership so as to conform with the Constitution and By-Laws of the State Medical Association.

Second: No person affiliated with the University of Minnesota shall be admitted to membership in the Minnesota State Medical Association unless he shall hold a similar membership in the local medical society within which his residence is established."

Motion made by Dr. Condit, seconded, and carried that the report be accepted.

The House of Delegates referred to the Council the appointment of a Committee to draw up a resolution to present to the American Red Cross opposing the resolution issued by that organization. Dr. Workman appointed Dr. Coventry and Dr. Savage."

I wish all the Delegates would carry that information home.

President Christison: You have heard the Report of the Council. What is your pleasure?

Dr. Jones: I move that the Report of the Council be accepted.

Dr. Hayes: I second the motion.

President Christison: It has been moved and seconded that the Report of the Council be accepted.

The motion was put to a vote and carried.

PRESIDENT CHRISTISON: I am going to ask the Secretary to read a couple of letters which came to me this morning. One of them is purely a business letter, and the other one I think perhaps will be to some of you rather a pathetic note and yet after you have heard it read, I hope that perhaps all of you will feel the same way as Dr. Workman and myself do about it—I have shown it to him—and perhaps will offer some Resolution that I may convey to the writer of this letter.

Secretary Meyerding read the letter.

PRESIDENT CHRISTISON: I am sure that all of you who have been active in Association matters in years gone by will remember Emmett Farr, his wise counsel, his leadership, the generosity with which he gave his time and talents not only to the Association as a whole but for many years he served as Chairman of the Board of Editors on the Editing and Publishing Committee of MINNESOTA MEDICINE. The service which he rendered in that particular position has been recognized by the Council and he has been made an Emeritus member of that Committee. Many of you doubtless know that dear old Emmett has been incapacitated for a long time and it would seem to me as though it would be fitting and appropriate if you would direct the Secretary on behalf of this House of Delegates to write an appropriate letter of acknowledgment to Dr. Farr. Of course, I shall write him personally and probably go and see him before very long, but I do think it would be nice if some official recognition was taken of this note.

DR. WATTAM: It would give me great pleasure to move that the Secretary be instructed to write a letter as indicated, to Dr. Farr.

The motion was seconded.

PRESIDENT CHRISTISON: It has been moved and seconded that the Secretary express to Dr. Farr in acknowledgment of this letter the good wishes of the House of Delegates and I am sure the Secretary will do this in his own inimitable way.

The motion was put to a vote and carried.

SECRETARY MEYERDING: Communication from the American Medical Association. (Letter from Dr. West read.)

PRESIDENT CHRISTISON: That letter is more or less self-explanatory. You doubtless are aware of the fact that the American Medical Association is running a questionnaire touching upon physicians' incomes. Dr. Drake in an earnest effort to assist the Association in getting material for this compilation ran a page in MINNESOTA MEDICINE. It is apparent that the American Medical Association does not wish it continued and therefore we shan't do it.

Has anyone else anything to offer under the head of new business?

Dr. Meyerding has called my attention to the fact that this is rather an unusual meeting. This morning the registration amounts in round numbers to 720 and in so far as anyone is aware, that is the largest registration we have ever had. Of course, you appreciate the fact that instead of the ordinary two-day meeting, this has really been a three-day meeting; the Ramsey County Medical Society putting on the morning of Monday and at the request of a number of gentlemen here and there throughout the State, we undertook to put on a Fracture Symposium yesterday afternoon. Now we would like to know, and I know Sam would like to know whether or not this meets with your approval—and whether or not you would like St. Louis County to follow our example and give us a three-day session in Duluth next summer instead of the two-day session. The floor is open for any remarks that you would like to make. We can only assume from the fact that the attendance has been—shall I say good, or better?—that somebody must like this sort of thing or you wouldn't have come in for the first day's meeting in such large numbers. We had 578 registrations up to six or seven o'clock last night. Am I to take it for granted that you do like this sort of thing and will you kindly pass this thing on to the gentlemen of Duluth so they will know whether or not they should have such an arrangement next year?

DR. KELLY: As one from the sticks, I want to say that for fellows in my situation, the program as arranged this year is a very happy thing. I was very glad indeed to come down Sunday evening so as to be here at 8:30 yesterday morning, and I am sure the attendance yesterday morning showed that there were many in like circumstances or in like opinion, and since it proved so successful this year, I think the incoming administration will find something on the same order equally desirable for next year.

SECRETARY MEYERDING: Dr. Strachauer will tell the story of the film. It is the same one that was shown upstairs.

PRESIDENT CHRISTISON: Before this meeting adjourns, I am going to call on my bashful friend on my right to say a few words to you. I am under the impression that he was rather taken off his feet when he was elected President, and for the time being his tongue cleaved on the roof of his mouth and it wouldn't work, but now that he has gotten his wits about him again, I am going to ask him to tell you how much he appreciated it.

DR. BOYER: Dr. Christison has said about what I wanted to say. It is difficult for one to analyze one's own thoughts at times, and I will say candidly to you that as I passed along the floor on my way out I was not thinking of the Presidency of this Association. When Dr. Christison beckoned me to come over here and I did come over and somebody said, "Now don't say you're surprised," I know perfectly well that if I said I was surprised I would be making a very hypocritical statement. Nevertheless, one never knows when lightning is going to strike. You may know you are going to be electrocuted, but you don't know when the shot is coming, and I was in that condition when I came over here. Something happened, not to my tongue, but to my brain. Something seemed to disrupt the association of ideas so extensively that I didn't

even have sense enough to say "thank you" and which I do now.

PRESIDENT CHRISTISON: If there is nothing further to come before this House of Delegates, a motion to adjourn is in order.

The meeting adjourned.

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THE THYROID AS A CAUSE OF CARDIAC DISABILITY*

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MODERN hygiene and preventive medicine have caused a remarkable decrease in the incidence and mortality of many diseases. The list includes those of a contagious, infectious and venereal nature. In addition, certain conditions resting on a metabolic basis are better held in check by the application of recently acquired knowledge. The use of insulin in diabetes and of iodine in goiter illustrate this class. With these advances the sum total of illness has markedly lessened and vital statistics show a steady improvement.

Other types of disease, in contrast, show little if any decrease and are steadily gaining greater prominence as causes of disability and death. Of recent years State and National bureaus of vital statistics as well as the larger insurance companies have repeatedly called attention to the ever mounting percentage of deaths from so-called heart disease. Some find this only a relative increase; others believe it to be an actual numerical increase which is greater than any corresponding increase of population.

Only a few of the many and varied types of heart disease will be mentioned here and their outstanding pathologic features touched upon. These are:

1. Hypertensive disease, usually associated with a progressive renal impairment, cardiac hyperthropy from overwork, sclerotic changes in the aorta and arteries and later atrophy of the heart muscle, rupture of an unsound cerebral vessel or failure of the renal filter with anuremic death.

2. Leutic disease which is primarily accompanied by an endarteritis of the smaller vessels and coronary arteries producing a deficiency of blood and oxygen supply to the heart. The lesions of the disease are most marked about the aorta and its valve, aneurysm is common and degenerative changes in the heart muscle are often present.

3. Rheumatic infection by the organisms of the streptococcus group, commonly considered the cause of rheumatic fever, chorea and focal infection in general. It may be mild or so severe as to end fatally in a few days. Actual inflammation of the endocardium and heart muscle as distinguished from the degenerative processes may be found in this particular form of cardiac disease. The lesions are most commonly on the left side of the heart and consist of damage to the mitral and less frequently to the aortic valve with sometimes an actual reduction in the power of the heart muscle as a result of inflammation and subsequent fibrosis.

Of greatest interest for the purposes of this paper are those conditions of the heart which follow hyperactivity of the thyroid gland. The protruding eyes, pulsating gland, moist skin, tremor and rapid irregular heart beat of exophthalmic goiter are so characteristic that the diagnosis is often correctly made by laymen. Here the cardiac lesions are less characteristic and distinctive than in any of the other types and there are few if any constant changes found at necropsy. Many of the disturbances seem to be confined to the conductive system and are looked upon as largely functional in nature. In the more severe and prolonged cases, however, there is probably some muscular damage. Goodall and Rogers[1] report these changes, in brief, to be those of an interstitial myocarditis. There are hyaline degeneration and necrosis of many bundles of muscles fibres and some infiltration of phagocytic cells. Certain of the necrotic areas are infiltrated by dilated capillaries choked with

*Presented before the annual meeting of the Minnesota State Medical Association, St. Paul, May 14, 1929.

endothelial cells. These authors also point to electrocardiographic evidence of myocardial damage. Valvular changes, with the exception of the relative insufficiency associated with ventricular dilatation, are conspicuous only because of their infrequency.

The functional disturbances are most distressing to the patient but early in the disease may be intermittent and their true significance is sometimes not appreciated by the clinician. Tachycardia of more or less severity is the most common and one of the earliest signs to appear but is of limited value in diagnosis. At times this assumes the form of typical paroxysmal tachycardia. Krumbhaar,[2] in 1918, reported auricular fibrillation, auricular flutter, sinus arrythmia, ventricular extrasystoles and delayed conductivity found in the electrocardiographic examination of a series of thyrotoxic cases. Other authors report similar findings.

Typical exophthalmic goiter offers no particular difficulty in diagnosis and that diagnosis suggests the treatment. When, however, a patient presents him- or herself with a purely cardiac complaint and shows no distinctive signs the problem of classification may be a most difficult one. To illustrate, the author wishes to present seven cases seen within the past few years whose complaints were purely cardiac. Careful study, quite prolonged in several instances, followed by thyroidectomy has resulted in vast improvement or cure in them all.

CASE REPORTS

Case 1.—Mrs. G., a married woman aged 53, had a peculiar, irritable disposition. She was easily excited and in addition possessed a mild pathologic fear of strange locations and travel, and was not at ease except in her own house. She had complained of cardiac rapidity and palpitation for about four years whieh her family had discounted because of her peculiar personality.

Her basal metabolism was plus 4 per cent. Her pulse was constantly above 100 with frequent premature beats. There was no exophthalmos, no enlargement of the neek, but the thyroid eould be felt by deep palpation. Blood pressure was systolic 190 and diastolic 100. There was a tremor of the hands when she beeame alarmed or exeited. Administration of 10 minims of Lugol's solution after meals for a week reduced the pulse rate to an average of 90, the blood pressure to 170/90. There was a sense of increased well being and a temporary cessation of complaint about her heart. The iodine was stopped and within a month her former symptoms had returned accompanied by visible enlargement of the thyroid.

Thyroidectomy was performed October 2, 1926, and after a mild post-operative reaction she made a good reeovery and returned home. Since that time she has gained thirty pounds in weight. Her pulse varies from 82 to 88, the systolic pressure remains about 160 and she denies having cardiac symptoms.

Case 2.—Mrs. M., a woman of forty-eight, who looked much older, had had "heart trouble" for about five years. It had reeently become more severe and she had had palpitation, taehycardia, shortness of breath and some swelling of the ankles. She had been unable to eat, had suffered from diarrhea, had had albumin in the urine, and she had lost 10 to 12 pounds.

The pulse varied from 120 to 130 and was markedly irregular. The skin was moist and a tremor of the hands was present.. The thyroid showed a small, almost insignifieant diserete eyst in the left lobe. The basal metabolic rate was plus 25 per eent.

A removal of the cystic portion of the left lobe was done August 27, 1926. She had a mild post-operative reaction and left the hospital after eleven days. The diarrhea eeased almost at onee and her appetite returned. The eardiae symptoms rapidly improved. After eight months she had gained forty pounds, the heart was regular and quiet and varied from 80 to 90 in rate. There was no sweating and she was symptom-free.

Case 3.—Miss L., a single woman of twenty-two years, had for the past two years been troubled with intermittent attacks of cardiae palpitation and rapidity of the pulse. For the past six months these attaeks had been coming at more and more frequent intervals. Between attacks she felt well and was able to live a normal, active life. The heart during these attacks attained a rate of 120 to 130 beats per minute and there was a definite preeardial impulse. She eomplained of pains in the left shoulder and arm and was quite nervous and apprehensive. Between attaeks the rate was 76 to 80 and she was symptomless.

There was a slight fullness of the neck which had been present for many years and the thyroid could be palpated. The blood pressure was systolic 120 and diastolic 64 and the basal metabolic rate plus 100. She was given Lugol's solution, 10 minims after meals, and remained symptomless for about one month, the longest period for over a year. There was a deerease in the size of the neek at this time. This was followed by an increase and she had several mild cardiac attacks.

Thyroidectomy was performed February 11, 1927, and she made an uneventful post-operative recovery. Colloid goiter was the laboratory report. This young woman was married a month and a half afterward and almost immediately became pregnant. She suffered occasional cardiac attacks for about six months but they became less frequent and she has now been symptom-free for more than a year.

Case 4.—Mrs. J. V., a rather stout Italian woman of thirty-three years, had for the past three or four years been gradually losing her strength and for a

year had been troubled by her heart. She was always aware of its beating, which was frequently rapid and she had pain at intervals in the left arm and shoulder. Her appetite was quite large and she had lost no weight.

There was no exophthalmos, no sweating, no tremor, no enlargement of the neck and the thyroid was not palpable. There was a slight pulsation in the neck and a bruit could be heard. Her pulse rate averaged 100 and rapidly rose to a higher rate on exertion. The heart was regular and there were no thrills nor murmurs present. The blood pressure registered 140 systolic and 64 diastolic. The basal metabolic rate was plus 28 per cent.

Thyroidectomy was performed June 21, 1927. She made a satisfactory post-operative recovery and four months after discharge was symptom-free and felt that she had made a complete recovery. Her pulse rate averaged 80 and no longer responded abnormally to exercise or emotion. She had gained a few pounds in weight but stated that her appetite was no longer as large as formerly.

Case 5.—Mrs. H., aged 40, widowed with two children, had had three attacks of chorea earlier in life. For a year she had had attacks of cardiac palpitation associated with fainting spells. She was somewhat nervous and had lost 8 to 10 pounds in weight. In the intervals between attacks she had felt well and had had no symptoms referable to the heart.

There was no enlargement nor pulsation of the thyroid; no sweating or other vasomotor disturbance. There was no exophthalmos. The blood Wassermann was negative. The heart rate averaged 90. The heart was not enlarged and there were no thrills nor murmurs present. The basal metabolism was plus 16 per cent.

Thyroidectomy was done on October 17, 1927, from which she made an uneventful recovery. All cardiac complaint ceased and weakness and fainting spells disappeared. She was able to resume work, gained back her lost weight, her pulse became steady and regular with an average rate of 80.

Case 6.—Mrs. S., a widow aged 46, had had "heart trouble" for two years. She was continually conscious of her heart beat and excitement or exercise caused violent palpitation and shortness of breath. She had seen numerous physicians during the past year with no relief. She had been forced to discontinue her work and had resigned herself to the life of a chronic cardiac invalid.

The neck was not enlarged, but a moderate pulsation could be felt on palpation. She would sweat at intervals, but the skin was usually dry. The heart rate varied from 90 to 100. There was no cardiac enlargement, and there were no thrills nor murmurs present. Frequent premature beats occurred. The blood pressure was 150 systolic and 80 diastolic. Basal metabolism was plus 25 per cent.

Thyroidectomy was performed October 9, 1928. There was a moderately severe post-operative reaction followed by a good recovery. Almost immediate relief of cardiac symptoms resulted and has remained. She has gained about fifteen pounds in weight and has resumed a normally active life.

Case 7.—Miss E., a spinster of fifty-eight years, had suffered from shortness of breath, cardiac palpitation and pain in the left shoulder and arm for about eighteen months. She had had frequent headaches and some nocturia.

On examination it was found that her systolic pressure varied from 190 to 200 degrees. There was a trace of albumin in the urine. The heart was enlarged 2 cm. to the left and beat about 90 to 96 times per minute. There was a visible precardial impulse but no irregularity. There was no enlargement of the thyroid gland, no exophthalmos, a slight tremor, but no sweating. Metabolic estimation showed an increase of 35 per cent.

Thyroidectomy was done November 9, 1928. The patient made a good recovery and has since gained about twenty pounds in weight. The heart is much less active, the pulse is about 80 to 84, the blood pressure 165 to 170 and she feels fully recovered, with no complaints.

These cases are undoubtedly representative of a much larger and frequently misunderstood group. The thyroid etiology has caused Lahey to refer to this condition as thyro-cardiac disease —an apt and fitting term. It is this type which offers a fertile field for the statistical improvement of the cardiac group.

In the diagnosis of this condition, estimation of the basal metabolic rate is of the utmost importance and when it is increased practically clinches the diagnosis. But, when the reverse is true, can we with equal certainty dismiss the thyroid from further consideration? This is a question of some delicacy but in the author's opinion we cannot. Undoubtedly every case of Graves' disease shows an elevated basal rate during a large portion of its course, yet the evidence may be missing just when it is most needed, due to the presence of a minimal hyperthyroidism, an inactive phase of the condition, the inherent limitations of laboratory methods, etc. Strauss,[3] Phillips,[4] and others voice the belief that cardiac irregularity may antedate increase of the metabolic rate. Several readings should be taken at intervals to bridge, if possible, an inactive period. Even then it is possible to run into error, and watchful waiting until the inevitable happens and the metabolism does rise, is not always advisable.

The administration of iodine in these cases must be recognized as a two-edged sword with potentialities for the production of improvement or further damage. Views differ as to its mode of action on the hyperactive thyroid and until the question is settled its use must remain a bit empirical. That the colloid content of the gland is restored and that temporary clinical improve-

ment and reduction of the basal rate follow admits of no debate. But, does it result from the saturation of a hitherto uniodized thyroxin with a reduction of its chemical avidity, as Kendall[5] and Plummer suggest, or does the increase of colloid exert a pressure which impedes the intrathyroid circulation, temporarily reducing the activity of the secreting cells and so lessening the amount of thyroxin released into the circulation; a view championed by Marine,[6] Mosser[7] and others.

Regardless of the exact mode of action, iodine is of considerable value in the formation of a diagnosis when more exact criteria are lacking. If, following its administration, there is a decrease in the heart rate, a lessening of the irregularity, loss of nervousness and tremor and a general symptomatic improvement in the patient the sequence is suggestive of a thyroid reaction. If after a short interval the symptoms return, perhaps even in an aggravated form, the resemblance is even more pronuounced and may form a step in the process of diagnosis. This provocative use of iodine should be employed only in those obscure and borderline cases where the greatest uncertainty is present. If a thyroid condition is behind the symptoms it is apt to be unmasked. If the thyroid is innocent, a short course of iodine stimulation is not apt to cause irreparable harm. To the truth of this statement the army of luetics who consume iodine freely and frequently bears mute witness.

In the severe but more easily diagnosed cases of hyperthyroidism it is axiomatic that iodine should be employed only as a preoperative measure and that thyroidectomy should be done before the secondary reaction gets under way.

The usual physical signs of hyperthyroidism may seem to be absent, but a careful search should be made for them. Tremor may be intermittent and if so can usually be elicited by mild excitement. Glandular enlargement may be absent or so slight as to escape notice. Pulsation is at times present even when the gland is not visibly enlarged and its presence is suggestive. The ocular signs, if present, are valuable aids to diagnosis. If absent, and usually they are, it proves nothing.

Several cases of this series have shown a pronounced increase in blood pressure and might easily be classified as chronic hypertensive cardio-renal disease. All were, however, materially benefited by thyroidectomy. It is common to find an elevated tension in hyperthyroidism which may frequently reach thirty points or more in well developed cases and proper removal of the gland usually reduces it appreciably. The experimental use of thyroxin is said to cause little or no variation in the blood pressure, so its increase in clinical cases is not well understood. It is indicative of the great complexity of the disease, possibly resulting as Crile[8] has recently argued, from an associated adrenal activity. Elliott[9] has commented at length on the cardio-renal variety of thyroid disease and estimates that in the Chicago area it is of equal importance to any of the other three major groups in the number of victims claimed. If true, it offers hope that it may be possible to check or even reduce the steady increase of heart disease, as these people can in the main be relieved and returned to active life by proper operative and perhaps other treatment.

CONCLUSIONS

The steadily increasing number of sufferers from cardiac disease includes many who have a masked hyperthyroidism as the cause. In the absence of another definite etiology no examination is complete which does not thoroughly investigate the thyroid gland and determine its relationship, if any, to the disease.

BIBLIOGRAPHY

1. Goodall, J. S., and Rogers, Lambert: The nature of thyrotoxic myocarditis. Lancet, March 5, 1927, 212:486.
2. Krumbhaar, E. B.: Electrocardiographic observations in toxic goiter. Am. Jour. Med. Sci. (February) 1918, 155:175.
3. Strauss, A. E.: Heart block, auricular flutter and adenoma of the thyroid. Med. Clin. No. Am. (September) 1927, 11, 2:487.
4. Phillips, J., and Anderson, J. P.: Cardiac disturbances in goiter. Jour. Am. Med. Assn. (October) 1927, 89:1380.
5. Kendall, E. C.: The active constituent of the thyroid. Jour. Am. Med. Assn. (September 14) 1918, 71:871.
6. Marine, David: The thyroid gland and its relation to diseases. Northwest Med. (February) 1928, 27:57.
7. Mosser, W. B.: The effect of iodine and thyroid feeding on the thyroid gland. Surg., Gyn. and Obst. (August) 1928, 47:168.
8. Crile, G. W.: Adrenal factor in hyperthyroidism. Surg., Gyn. and Obst. (March) 1929, 48:371.
9. Elliott, C. A.: Cardiac disturbances associated with hyperthyroidism. Internat. Post. Grad. Med. Ass'n Proc. 1927, 3:286.

PRELIMINARY HEMOSTASIS IN THYROIDECTOMY*

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ONE of the most important principles of surgery is good hemostasis. This principle is particularly applicable in the surgery of the thyroid gland. To emphasize this, it is only necessary to call attention to the fact that the normal thyroid is 28 times as vascular as the head, 5½ times as vascular as the kidney, and that the entire blood of the body passes through the gland 16 times each day. The importance of preliminary hemostasis, based on a thorough knowledge of the anatomy of the thyroid gland, is at once evident.

The history of thyroid surgery contains much evidence of the importance of effective hemostasis. In the operative cure of goiter, the fear of hemorrhage has always been the greatest single barrier to the success of the operation. As early as 1883, Kocher developed a technic for thyroidectomy, which remains relatively standard today. In 1884, he reported a series of 250 operations for goiter with a mortality of only 2.4 per cent. He was the first to realize the value of thorough preliminary hemostasis.

In 1910, de Quervain, one of Kocher's most able students, reasoned that thyroidectomy could be further simplified by the preliminary ligature of the inferior thyroid arteries. At that time, in an experimental study, he injected the fascial spaces of the neck with various colored gelatine mixtures and from his studies devised an easy and practical method of approach for the extrafascial ligation of the inferior thyroid arteries. His findings were somewhat different from those usually described by the anatomists and are as follows (Fig. 1):

1. The thyroid gland is enveloped in a thick layer of its own fibrous tissue, called the *capsule propria.*

2. The thyroid gland is surrounded by a space containing a layer of fine connective tissue and relatively large veins. This is called the thyroid space and contains on the posterior side, besides these veins, branches of the superior and inferior thyroid arteries, the parathyroid bodies and recurrent laryngeal nerves. This space is the usual site for the ligation of the branches of the inferior thyroid arteries.

3. In front of this space is the thyroid fascia, usually referred to as the external capsule. This fascia is the posterior wall of the sternothyroid muscle and laterally forms the median boundary of the blood vessel sheath. It continues posteriorly in single lamellæ to the trachea, esophagus and spinal column.

4. In front of this thyroid fascia is the small muscle space, containing the sternothyroid and sternohyoid muscles, which in turn is separated from the sternomastoid space by a thin fascial sheath. He further found that the inferior thyroid artery usually divides into its branches before it penetrates the external capsule and enters the thyroid space. In this space, also, the recurrent laryngeal nerves pass between the branches of the inferior thyroid artery, as shown in the accompanying figure (Fig. 2). This has been verified by Drs. Fowler and Hanson, of the Univer-

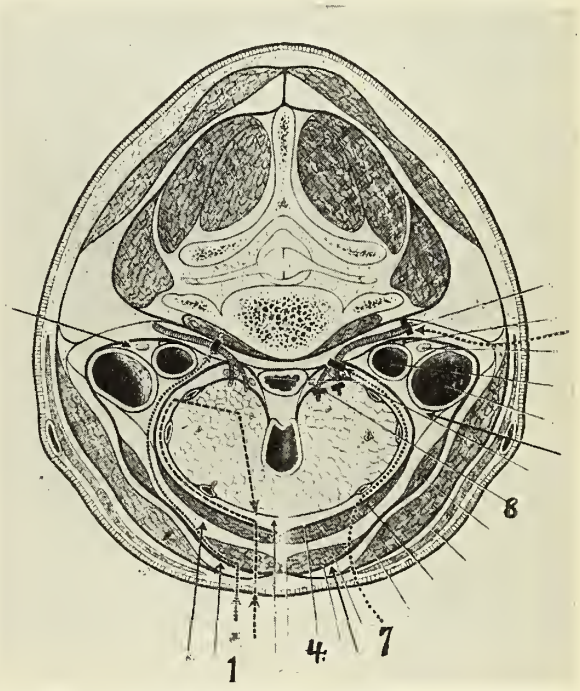

Fig. 1. Outline of the fascia and spaces in the region of the thyroid gland, showing (1) extrafascial ligation of the artery by this method; (4) external capsule; (7) usual site of ligation of inferior thyroid artery; (8) near the recurrent laryngeal nerve (8). (de Quervain.)

*Presented before the annual meeting of the Minnesota State Medical Association, St. Paul, May 14, 1929.

sity of Minnesota, in a study of the anatomy of the thyroid gland in more than 200 cadavers (Fig. 3).

De Quervain concluded that it would be logical to ligate the trunk of the inferior thyroid artery outside of this space and the capsule, thereby obtaining more certain hemostasis and avoiding the recurrent laryngeal nerve, rather than applying ligatures to the branches of this artery inside of the capsule with greater hazard to this nerve. He, therefore, adopted the following extrafascial approach to the inferior thyroid artery, which we have employed almost routinely in the last three years.

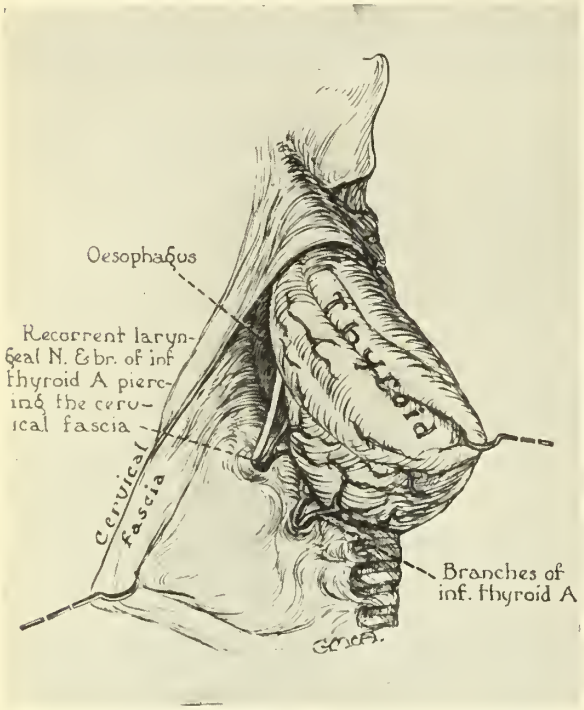
Oesophagus
Recurrent laryngeal N. & br. of inf thyroid A piercing the cervical fascia
Cervical fascia
Thyroid
Branches of inf. thyroid A

Fig. 2. Branches of inferior thyroid artery and recurrent laryngeal nerve, entering *thyroid space* through *thyroid fascia*. Usual site of ligation. (Fowler and Hanson.)

The technic of the extrafascial approach to the inferior thyroid artery is as follows: The usual collar incision is made with ligature of the small superficial veins (Fig. 4). The median border of the sternomastoid muscle is liberated and drawn outward with a blunt retractor. The fascia on the surface of the prethyroid muscles is now visible. Next, a vertical slit 3 cm. long is made in this premuscular fascia and the outer edge is pared gently back and caught up with the retractor (Fig. 5). The finger is inserted and worked in deeply in a median direction, along the mesial side of the carotid, which is in this manner separated from its fine connective tissue surroundings (Fig. 1 and 6). The finger now usually touches the inferior thyroid artery, which crosses beneath and at right angles to the carotid vessels, at the level of the sixth cervical transverse process (usually marked by a small tubercle). Then with the aid of two long blunt dissectors, the artery is cleaned and separated from the deep cervical fascia and a ligature is passed with a small carrier (Fig. 7). The retractors are now removed and thyroidectomy carried out by any procedure suitable to the surgeon, the capsular veins being noticeably free from blood.

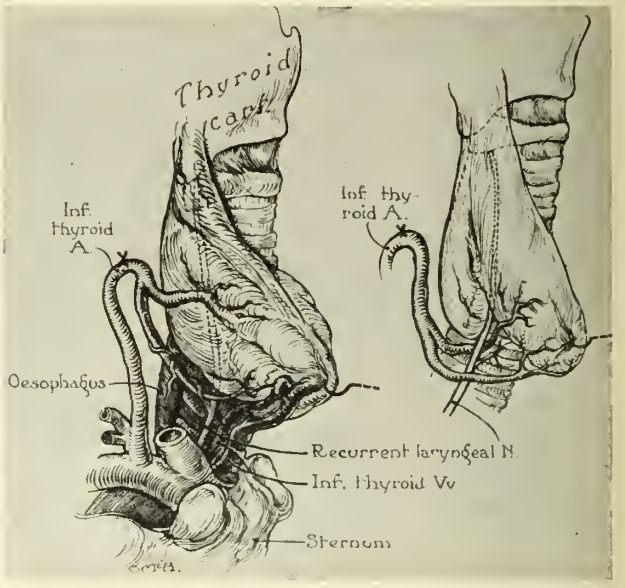

Fig. 3. Site of *extrafascial* ligation to trunk of inferior thyroid artery (X) and relation of branches to recurrent laryngeal nerve. (Fowler and Hanson.)

The *advantages* of the preliminary extrafascial ligations of the inferior thyroid arteries are as follows:

1. It fulfills one of the first principles of surgery, that of hemostasis.
2. It lessens bleeding from the capsular veins of the thyroid, resulting in a cleaner and dryer field for the subsequent thyroidectomy.
3. Because the ligature is applied to the trunk of the artery, outside of the field of operation, rather than to its branches, hemostasis is obtained with a greater degree of accuracy and at a greater distance from the recurrent laryngeal nerve.
4. The method is particularly advantageous in attacking glands adherent, from previous operation, to surrounding structures, long continued iodization or old inflammatory processes.

5. Thyroidectomy is simplified because the ligature is applied before rather than after the luxation of the goiter. The procedure is, too, of particular advantage in intrathoracic goiters, because the circulation is thereby reduced.

measure in the surgical treatment of all goiters, but particularly the toxic goiters in this country.

Since adopting this method, we have been frequently questioned regarding the danger to the nutrition of the parathyroid with this procedure.

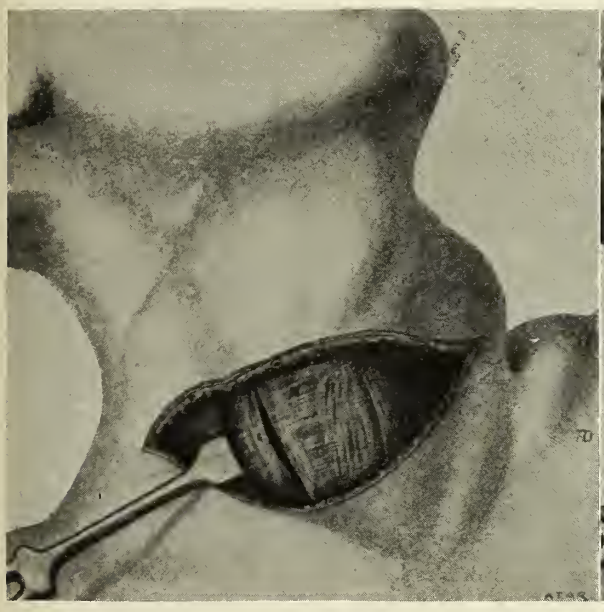

Fig. 4. Neck incision. Anterior jugular veins tied, and the aponeurotic sheath of the small muscles incised. The sternomastoid muscle is under the retractor. (de Quervain.)

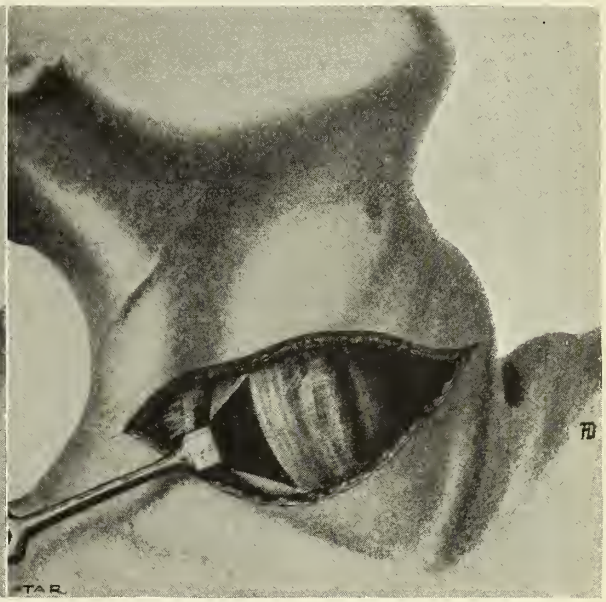

Fig. 5. The aponeurotic sheath, the small muscles and the sternomastoid are beneath the retractor: The sternohyoid and sternothyroid are exposed. The finger penetrates through the space thus made in order to find the inferior thyroid artery. (de Quervain.)

6. The application of the ligature at a distance from the thyroid gland protects rather than endangers the parathyroid bodies, as well as the recurrent laryngeal nerves.

7. In our experience with this method, used since 1926, we have noted less post-operative drainage, shorter convalescence and better scars.

COMMENT

The purpose of this paper is to introduce a safe preliminary step in thyroid surgery, advocated, employed and proved practical by de Quervain in his goiter clinic since 1911. It is further the purpose to demonstrate that this method is just as logical in the operative treatment of goiter in his country as in Switzerland.

Mastin, at the Mayo Clinic, as well as Hertzler and Reinhoff, all three of this country, agree that the inferior thyroid artery is uniformly larger by one-third than the superior thyroid artery, in both normal and diseased glands.

Since this is a simple and easy method, we believe it is a practical procedure as a preliminary

It has been proved, both experimentally and clinically, that the conservation of the parathyroid glands by this method is no longer theoretical. Experimentally, Pettenkofer, Enderlin and Hotz have demonstrated by injections into the ascending aorta in cadavers, that even after the ligature of all four arteries at their points of origin, good injection of the thyroid vessels occurs. Hence, we see that the blood supply of the parathyroids is not interfered with. Wangensteen, recently, in an excellent review of the literature, relative to the blood supply of the thyroid gland, finds ample proof of this fact.

Clinically, de Quervain proved the method both safe and practical, when in 1922 he reported the ligature of both the inferior thyroid arteries in 815 cases, both the inferiors and one or more of the superiors in 611 cases, and all four arteries in twenty-two cases, without the development of a single case of tetany. Enderlin and Hotz confirmed these results by similar clinical applications of this method, in a large number of cases. Since 1926, we have employed this technic in a

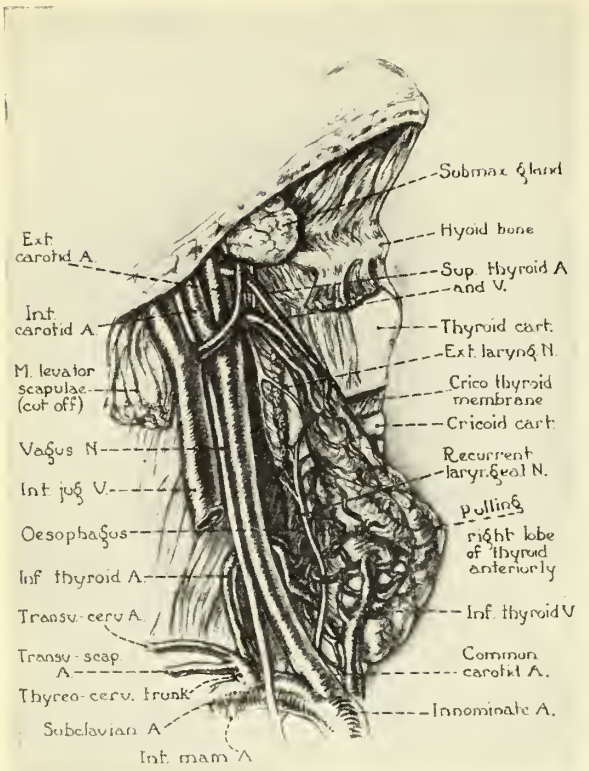

Fig. 6. Course and relations of inferior thyroid artery. Ligature applied by this method to inferior thyroid artery as it emerges just mesial to common carotid. (Fowler and Hanson.)

Fig. 7. Exposure and ligature of the inferior thyroid artery. The carotid artery, superficial aponeurotic sheath of the small muscles, and the sternomastoid muscle are under the *external retractor*. The goiter covered by the sternohyoid and sternothyroid muscles are under the *internal retractor*. The carotid is really covered more than the illustration indicates by the prolongation of the sheath of the small muscles. (de Quervain.)

total of 126 cases, and no case of tetany has been observed.

Summary of Ligations of Thyroid Arteries in 186 Cases

Number of Ligatures	1	2	3	4
Number of Cases	12	72	97	5
Percentage	8.5	38	51	2.5

SUMMARY

1. Preliminary ligation of the inferior thyroid arteries in goiter surgery makes a neat, clean and practical operation.

2. Thyroidectomy becomes a safe procedure with this method, because of better protection to the laryngeal nerves and the parathyroids.

3. Preliminary ligation of the inferior thyroid arteries has proved to be a good method of attack:

(a) In densely iodized goiters because it is outside of the field of operation.

(b) On recurrent toxic goiters when this procedure was not performed at the original operation.

4. This method gives better hemostasis because ligation is performed before division of the artery takes place and because the inferior artery is normally one-third larger than the superior and furnishes the main blood supply to the gland.

5. The danger of post-operative hemorrhage is reduced to a minimum.

6. Since fewer catgut ties are necessary within the gland, and, because the operative field is more dry, there is consequently less post-operative drainage, a more rapid convalescence, a better scar and a greater chance of permanent cure.

BIBLIOGRAPHY

de Quervain, Fritz: Preliminary hemostasis in goiter operations. Surg., Gyn. and Obs., 1916, 33:402.

de Quervain, Fritz: Goiter and thyroid diseases. Wm. Wood, New York, 1924.

Deaver, J. B.: Surgical anatomy. Blakeston, Phil., 1926, 2:568.

Enderlin, E., und Hotz, G.: Beitraege zur Anatomie der Struma und zur Kropfoperation. Ztschr. f. ang. Anat., 1918, 3:57.

Fowler and Hanson: Anatomy of the thyroid gland. Read before the Henn. Co. Med. Soc. Dec. 3, 1928.

Giordano, A. S., and Caylor, H. D.: Histological study

of the effect of ligations of the thyroid vessels in exophthalmic goiter. Surg., Gyn. and Obst., Jan. 1923, 36:75.

Halsted, W. S.: The operative story of goiter. Johns Hopkins Hosp. Rep., 1920, 19:72.

Hertzler, A. E.: Diseases of the thyroid gland. C. V. Mosby Co., St. Louis, 1929, p. 243.

Mastin, E. V.: The blood supply of the thyroid gland and its surgical significance. Surg., Gyn. and Obst., 1923, 36:69.

Mayo, C. H., and Pemberton, J. deJ.: Surgery of the thyroid and its morbidity. Trans. Amer. Surg. Assn., 1923, 41:112.

Pettenkofer: Beitrag zur operativen Behandlung zweiseitiger Strumen. Beitr. z. klin. Chir., 1914, 93:275.

Wangensteen: The blood supply of the thyroid gland. Surg., Gyn. and Obs., May, 1929, 48:613.

Wilson, L. B.: Experimental lesions in the cervical sympathetic ganglia in relation to exophthalmic goiter. Am. Jour. Med. Sci., 1918, 155:553.

THE UNITED STATES PHARMACOPEIA

The United States Pharmacopeia is published by authority of the United States Pharmacopeial Convention. This body meets once every ten years, and its chief function is the selection of the Committee of Revision of the United States Pharmacopeia. To this committee is assigned the task of issuing the revised edition of the book. The next Pharmacopeial Convention has been called for May 13, 1930, at which time the delegates appointed by the constituent bodies will meet and inaugurate the preparation of the eleventh revision of the Pharmacopeia. At the time when instruction in medical schools in subjects related to therapy and drugs was wofully deficient, and when conditions made necessary the establishment by the American Medical Association of its Council on Pharmacy and Chemistry, the Pharmacopeia promised to degenerate into a mere book of standards for drug control officers. In 1916, when the ninth revision of the Pharmacopeia made its appearance it was pointed out that it was a book of standards for drugs but not a book of standard remedies. Largely as a result of the renewed interest in scientific drug therapy which was created by the Council on Pharmacy and Chemistry, there was so much interest taken in the following revision of the Pharmacopeia that, at the convention held in 1920, the medical members of the revision committee were in effect delegated to decide which of the drugs in the ninth revision were to be retained in the tenth and which were to be omitted as being of insufficient usefulness, and as a result the tenth revision is a book with which physicians and pharmacists may justly be satisfied. In order that the next revision may correctly reflect the advances in drug therapy, the medical and other bodies entitled to send delegates to the coming convention should give serious consideration to the appeal of the Council on Pharmacy and Chemistry that competent delegates be sent to this convention. (Jour. A. M. A., September 28, 1929, p. 990.)

THE EXOPHTHALMOS OF GRAVES' DISEASE*

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THE syndrome known as Graves' disease or exophthalmic goiter was described by Brams as an endocrine and nervous dysfunction, not necessarily accompanied by exophthalmos nor by thyroid enlargement. In his studies of the relationship of exophthalmos to goiter, the incidence of exophthalmos of moderate, marked or extreme degree was approximately 49 per cent. It occurred unequally in twenty-five, and unilaterally in thirty-five patients. Brams[1] found these features unrelated to asymmetry of the thyroid lobes. Age did not affect the incidence and the exophthalmos rarely preceded goiter symptoms. The degree of exophthalmos bore little relationship to the severity of the disease, though it was found to vary in degree without variation in other symptoms. It is the last symptom to disappear after all others are relieved by appropriate measures, and it may not be expected to disappear when it has persisted for a long period. Halloway[2] and associates also found exophthalmos present in practically 50 per cent of toxic hyperplastic goiters. It was almost never observed in either toxic or non-toxic adenomatous types. His observations were made by inspection verified by exophthalmometer measurement. Few will hold with Claiborne[3] that exophthalmos is a first and basal sign of exophthalmic goiter or that the great majority of other signs follow this sequentially, in view of collected evidence to the contrary.

The eye presents many other dramatic and striking signs and symptoms associated with Graves' syndrome. Practically all eye signs have acquired the names of the observers who first described them, and may be briefly stated as follows:

OCULAR SIGNS OF GRAVES' SYNDROME

Parry: Exophthalmos

Dalrymple: Peculiar stare. Retraction of upper eyelid.

Von Graefe: Tardy downward movement of the lid, when rotating eyeballs downward.

Stellwag: Diminished winking frequency. Imperfect lid closure with winking.

Mobius: Imperfect power of convergence.

Jellinek: Pigmentation of eyelids. Edema.

Gifford: Difficulty in eversion of upper eyelid.

Sukers: Visual fixation from extreme lateral rotation.

Wilder: Jerking or twitching of globe when moving eye from extreme abduction to adduction.

Kocher: Movement of upper lid upward leaving eyeball behind, when gaze is directed to upward moving object.

Joffroy: Absence of brow wrinkling when looking upward, with the head downward.

Rosenbach: Fibrillary tremor of closed eyelids.

In addition to these we may have nystagmic tremor of the globe, paresis of extraocular muscles, occasional orbital bruit, pulsation of the retinal arteries, and inconstant changes in the field of vision. Even when exophthalmos is absent, the Dalrymple stare, Graefe's, Joffroy's or any other sign may be present with any of the types of goiter. Many of them accompany or precede, but are not the result of, exophthalmos. Halloway observed Graefe's sign present in 90 per cent with, and in 67 per cent without, exophthalmos; but it was also noted in 68 per cent of toxic and in 35 per cent of non-toxic adenomas. The Dalrymple stare occurred in 65 per cent of patients with, and in only 25 per cent without, exophthalmos in the toxic hyperplastic group; it was present in 13.6 per cent of cases classed as toxic and 19.5 per cent of non-toxic adenomas. Edema of the lids was observed in toxic and non-toxic adenomatous patients almost as frequently as in those of the toxic hyperplastic group.

One may observe quite complete eye symptoms usually associated with goiter without other clinical signs of thyroid disease.

Case 1.—Mrs. O. H. P. came to me Sept. 10, 1925, for explanation of moderate exophthalmos of a few months development. Dalrymple's stare with very marked upper lid retraction; the Graefe's, Kocher's, Mobius' and Stellwag's signs were all present. There was noticeable difficulty in rotating the eyes upward,

*Presented before the annual meeting of the Minnesota State Medical Association, St. Paul, May, 1929.

but no demonstrable paresis of the superior recti. There was less exophthalmos when the lids were closed, but it was increased when the eyelids were open. The exophthalmos became sufficient to require night bandaging. She was quite nervous but this had apparently developed after the exophthalmos, which had caused much insomnia. Dr. Frederick Mitchell and Dr. James B. Gilfillan could find no clinical or physical nor sufficient laboratory evidence for a diagnosis of exophthalmic goiter. After four years the eyes are only slightly changed, but she has developed a left convergent squint. She has developed none of the classical symptoms of exophthalmic goiter.

Zeeman[4] records a similar case of Graves' eye syndrome with a normal basal metabolism (by two tests) without tremor, or tachycardia, but with some nervousness. MacCallan[5] recorded a somewhat similar case with extreme exophthalmos, in which the autopsy revealed a thickened pia-arachnoid which interfered with return flow of lymph from the orbit. A history of cerebrospinal fever some years previously afforded a probable explanation for the condition.

How may this clinical picture solely of the eye symptoms be explained? When associated with other goiter symptoms, undoubtedly some of the eye symptoms, particularly those affecting the lids, may be attributed quite logically to the effect of irritation of the cervical sympathetic, and resulting stimulation of the unstriped, lid-retracting muscle of Muller. Others might be explained on an ataxic or asthenic basis or simply by nervous dysfunction. In my patient there were no other toxic goiter symptoms and it is difficult to explain the condition without assuming some other infectious source of toxic irritation of the sympathetic ganglia than one produced by the thyroid gland. This hypothesis indirectly gains some support from the report of L. B. Wilson,[6] who was able to experimentally produce lesions in the cervical sympathetic in goats by electric stimulation and by bacterial inoculation. He concluded "it would appear that irritation from the presence of certain bacteria within the cervical sympathetic ganglion of the goat, may produce histologic pictures within the ganglion, and also the thyroid, which parallel those found in various stages of goiter. The evidence supports the suggestion that the thyroid receives its stimulation to overfunction through its nerve supply, and as a result usually of a local infection in the cervical sympathetic ganglion." It is conceivable that the eye might likewise become involved without thyroid involvement. Perhaps we reason incorrectly when we assume the sympathetic irritation follows thyrotoxicosis. Do we actually know the relationship between the function of the thyroid and its control by the sympathetic? May not the eye symptoms, along with all other symptoms accompanying dysfunction of the thyroid, be primarily due to some factor which also disturbs sympathetic control of the endocrine system without the thyrotoxic medium?

Fig. 1, Case 1. Von Graefe's sign.

A certain degree of variation in exophthalmos may occur with abnormal dimensions of the globe, with asymmetry or variation in orbital and skull dimensions, with the age, race, etc., of the individual; also physiologically with many other factors. The position of the eyeball is ordinarily such that the summit of the cornea lies just within a vertical plane touching the superior and inferior orbital margins. Practically all postmortem examinations of exophthalmic cases have revealed excess of orbital fat, and abnormal edema of the fatty tissues of the orbit with more or less infiltration. Edema of the orbital tissue is explained on the ground of a vasomotor disturbance which in turn is attributed to the influence of the sympathetics. H. Foster Moore[7] in dissecting out excessive fat in a case which threatened serious consequences, found the mus-

cles greatly swollen, with fusiform bellies, apparently from edematous infiltration, as thick as the last little finger joint. Carl Fisher[8] noted in sections of the recti removed from goiter cases that there was true parenchymatous degeneration of muscles, not simply atrophy, and the orbits were full of fat. Many explanations have been offered for the mechanism producing exophthalmos. Basedow himself looked upon the protrusion of the bulb as a result of strumous hypertrophy of the cellular tissue within the orbit even though patients were much emaciated.

Tilley[9] believes exophthalmos is produced through the mechanism of the widened palpebral fissure incident to the Dalrymple stare. By actual measurement he found little forward protrusion of the globe until the palpebral fissure exceeded its normal width; that exophthalmos is much less during sleep and becomes greatest after lids have passed the limits of normal palpebral fissure opening. It is suggestive that the normal orbital tissue tension causes extrusion of the globe when the lids cease to exercise their restraining functions. Furthermore, to quote him, "it is obvious that this explanation would of necessity assume an increase in retrobulbar tissue to occupy the space and maintain the tissue tension resulting from anterior movement of the eyeball." Thus he reasons "increase in retrobulbar tissue is due to the anterior dislocation of the eyeball rather than the cause of it."

Landstrom[10] described an involuntary muscle passing from peribulbar attachment into the eyelids which he considered to be the cause of the exophthalmos of goiter. This has also been demonstrated by Hesser, but many anatomists seem unable to find it. Even though innervated and influenced to overaction through stimulation of the sympathetics, as Carl Fisher says, "it is mechanically impossible even if the unstriped muscle were strong enough to overcome the force of the recti."

Treacher Collins[11] held the view that Muller's orbital muscle (which bridges the sphenomaxillary fissure and which is well developed in lower animals) is responsible for exophthalmos because it is innervated by the sympathetic, and would tend to increase in power from prolonged stimulation, in cases of long standing. In lower animals it is often spoken of as the "protrusor bulbi," and undoubtedly does serve to protrude the globe, but in man it is a poorly developed vestigial structure. One is not able to find in the literature any definite autopsy proof of hypertrophy of this structure. Anatomically it exists beyond doubt and although Krauss and Frund[12] contend that contraction of this muscle would influence the venous circulation by compression of the ophthalmic vein, thereby accounting for the exophthalmos seen with goiter, Whitnall[13] rejects this theory on the basis of "free anastomosis between the veins of the orbit and those of the face would obviate the questionable engorgement that neither the effect of compression of the venules traversing it, nor protrusion of the orbital contents could be much affected," by a muscle so thin as he found it. Also J. H. Fisher, in discussing Collins' theory, argues that if irritation of the sympathetic produces exophthalmos through any action of the sphenomaxillary muscle of Muller, we should get *en*ophthalmos, as one of the signs of paralysis of the cervical sympathetic nerves producing loss of tonicity in that muscle. He did not so find it when paralysis of the cervical sympathetic nerves occurred.

Another explanation was offered by O'Day,[14] who found postmortem varicose orbital veins associated with infiltration and edema of the orbital fat. His theory of the mechanism of exophthalmos is based partly on the fact that it usually occurs as a late symptom with hyperthyroidism, associated with prolonged and violent tachycardia; that there results inability of the ventricles to fill, with engorgement of the whole venous system and consequent stasis of the cavernous sinuses into which the orbital veins empty; this venous engorgement (in his case amounting to varicosity) produces the orbital edema causing exophthalmos. While this mechanism might account for the edema of the orbit found in certain cases, it affords no explanation when tachycardia is absent. Bulson[15] questions, if exophthalmos is due entirely to venous congestion, why there is no more evidence of congestion in the nasal, frontal, and supraorbital veins, communicating with the ophthalmic veins, or evidence of venous stasis of the retinal veins, which there is not.

The theory of vasomotor dysfunction caused by thyrotoxic influence upon the sympathetic nervous control with localized arterial dilation as a cause of exophthalmos is one most difficult to prove. The uncertain results which have followed the operation of Jaboulay,[16] and extensive-

ly practised by him, Jonnesco, Balescu, and by C. H. Mayo[17] for a time, in which the removal of the superior cervical ganglion, or removal of both superior and middle ganglia and intervening strand, have been of little help in the control of bulbar protrusion. The operation is now very rarely done. According to DeSchweinitz,[18] "the sympathetic nerve displays its effect on the eyeball in two different ways—by contraction of the unstriped muscles of the orbit, Muller's muscles, and by vasomotor influence. If Muller's muscle contracts there is protrusion, but if there is contraction of the orbital vessels then there is sinking in: predominance of the one influence will cause exophthalmos, predominance of the other, enophthalmos." Unverricht could not attribute exophthalmos to irritation of the sympathetic in view of experiments conducted by him upon living patients by faradism and pinching of the nerves, and because of the negative results following resection of the sympathetic by Kocher and Garre. He quotes Goldscheider's opinion that exophthalmos is due to infiltration of plasma into the retrobulbar tissues, through venous congestion or toxic vascular paralyis.

It seems most reasonable therefore to limit the theories in explanation of exophthalmos with goiter to a combination of factors based on the somewhat limited pathological and clinical findings. Tilley's contention of the restraining influence of the lids with proptosis following retraction of the lid, seems reasonable. Stasis of the venous circulation and resulting edema of the orbital tissues therefrom is definitely proved. The vasomotor influence of the sympathetic is undoubted. The hypertrophic degenerative changes in the ocular muscles probably result from long continued congestion and spasticity. The fact that exophthalmos does not recede after death in long-standing cases and remains as a residual symptom after successful thyroidectomy, is what one would naturally expect from hyperplasia.

Exophthalmos becomes serious from a clinical viewpoint when so extreme that the cornea becomes involved from imperfect lid closure. The lessened corneal reflex, infrequent winking, the insensibility of the cornea from exposure, together with the probable trophic influence due to stasis and protrusion, may give rise to most serious consequences. In certain cases corneal anesthesia becomes quite marked. The loss of eyesight or of the eyes themselves through the influence of exophthalmos is by no means rare. Sattler[20] collected seventy-four cases in which one or both eyes were lost as a result of exophthalmos. In the majority of these the right eye was first affected. Von Graefe[21] reported three cases, and collected twenty-two others in which eyes were lost from extreme protrusion with corneal ulceration. All observers comment on the difficulty in extreme exophthalmos of controlling the keratitis by local measures sufficient to stay the process and prevent destruction of the eyeball. Many reports seem to point to some influence of trophic as well as purely mechanical factors and that the pure element of infection is not the chief contention. At times the exophthalmos seems to assume an unusual malignancy demanding superlative surgical skill, often with ineffectual results. Saenger and Baer[22] reported a case of acute malignant exophthalmos involving both eyes with keratitis, not controlled by tarsorrhaphy, thyroidectomy, and extirpation of both cervical sympathetics. The pathological examination showed peculiar brawniness of the orbital fat (lipodystrophy) with dilated blood vessels and lymphocytic infiltration. Juler[23] has reported a case in which one eye was lost notwithstanding canthotomy, repeated tarsorrhaphy, and orbital incisions. The second eye was saved only after repeated lid operations, conjunctivoplasty, excision of the sympathetic ganglion and *x*-ray treatment of the goiter. Cross, Coulter,[24] Thompson, Paton,[25] and many others have reported similar experiences; some of these have occurred after thyroidectomy had successfully relieved all other symptoms.

Without much enthusiasm, I wish to report a case which proved to be malignant exophthalmos eighteen months following complete relief of all goiter symptoms by thyroidectomy, in the hope that the suggestions which follow may be of value to others.

Case 2.—Mr. A. H., aged 62, was referred by Drs. Gelz and Wenner of St. Cloud on June 20, 1928, on account of marked exophthalmos of the right eye noticed six weeks previously, with slight diplopia, with edema of the upper left eyelid. A Kronlein exploration at St. Raphael's Hospital, St. Cloud, May 26, 1928, had revealed no definite tumor. The tissue removed was pathologically reported as "simply fatty tissue." When admitted to the Miller Hospital, St. Paul, there was exophthalmos of the right eye of 7 mm., vision was reduced to 3/200, and conjunctiva was edematous and protruded beyond the lids; there was moderate

ciliary congestion. The lids were retracted and would not close over the cornea, the upper lid being very edematous and boggy, especially near the inner angle. The intraocular tension was normal, the pupillary reaction normal, the field of vision contracted in the temporal field uniformly to about 30. No definite mass in the orbit could be detected on palpation. Corneal anesthesia was present, which, with trophic changes, complete. Excepting pneumonia twenty years previously and complaint of indefinite digestive disturbance his medical history was essentially negative. His habits had been exemplary. His wife had died from complications attending exophthalmic goiter.

On admission here for his eye trouble, the physical examination showed a well built man weighing 170 lbs., with no evidence of any organic diseases. The goiter

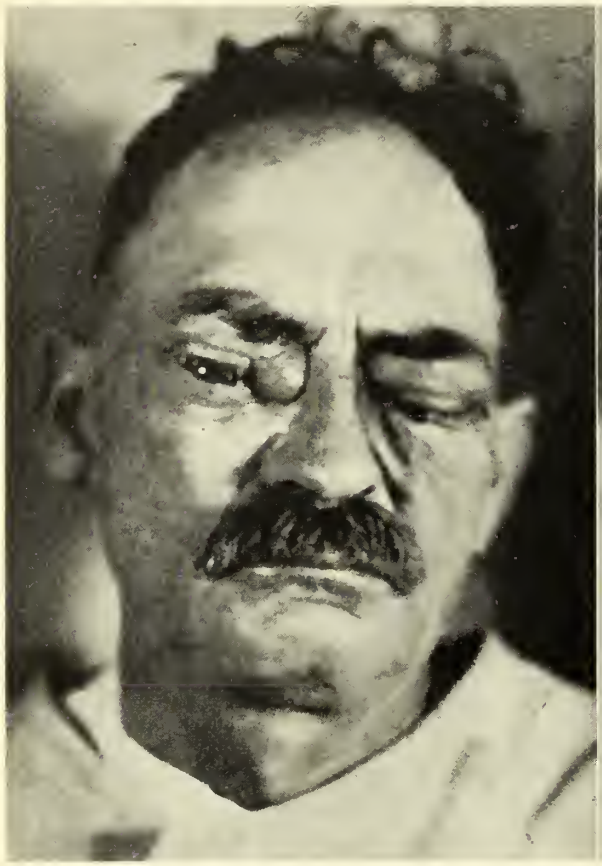

Fig. 2, Case 2. Edema of the eyelids.

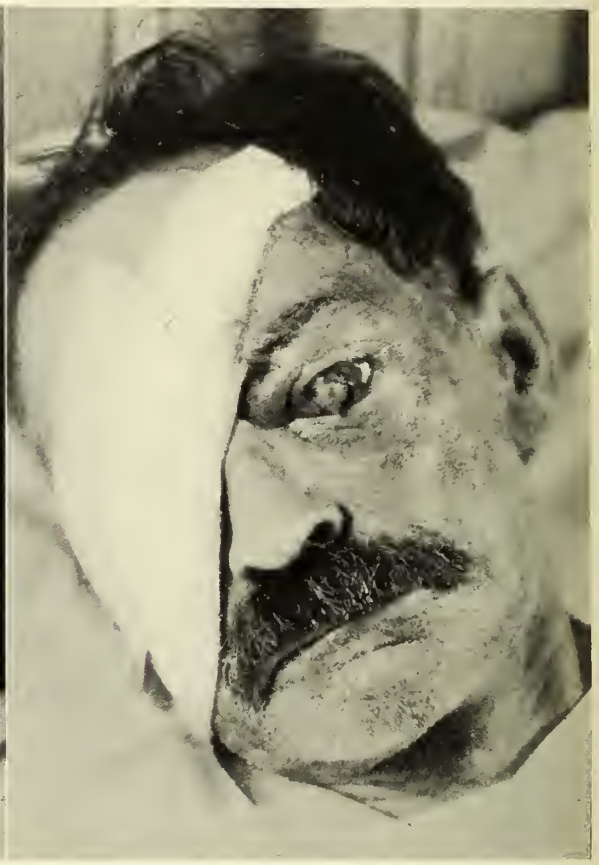

Fig. 3, Case 2. Staphyloma following corneal ulcerations.

was probably an important factor in subsequent serious complications. For a few weeks there was no appreciable exophthalmos of the left globe and excepting slight edema of the upper lid the left eye was normal and vision was 20/25. In neither eye could any abnormal fundus changes be observed. The optic discs were normal. Possibly one might remark that the veins were slightly overfilled in each eye.

Through the courtesy of Dr. H. P. Wagener, of the Mayo Clinic, I was given the earlier history of this case. Mr. H. was a patient at The Mayo Clinic in December, 1926, complaining of palpitation, dyspnea, nervousness, and tremor, weakness and epigastric distress. He had the stare and von Graefe sign but no definite exophthalmos. His B.M.R. upon two tests was +20 and +34. A subtotal thyroidectomy (substernal thyroid) was done. The pathological diagnosis was hypertrophic parenchymatous thyroid. His convalescence was uneventful. Mr. H. stated that his recovery was had not recurred; the blood pressure was 110/65, pulse 60 to 70, temp. normal, blood count, rbc. 5,340,000, white 7,000, Hb. 90, Polym. 65 per cent, Lymph. 32 per cent, Eosin. 3 per cent, Wassermann negative, urine negative. Because of his general distress the B.M.R. was not tested. Dr. C. E. Connor found no evidence of any sinus disease. The *x*-ray skull pictures showed only slightly increased density of the right orbit and sinus areas. Drs. J. B. Gilfillan and H. B. Zimmermann, who saw Mr. H. in consultation, could find no evidence to support a diagnosis other than tumor or some interference with the orbital circulation producing stasis. The ophthalmic clinical picture was not unlike that seen in cavernous sinus thrombosis. After ten days of local treatment with White's ointment, to protect the cornea, and warm astringent compresses, with salicylate of sodium, grs. XX given intravenously daily, the patient returned to his home for further observation and treatment. A tentative diagnosis of orbital sarcoma or

orbital metastasis was made, although there was no strong support for either diagnosis, in the orbital or in the general physical examination. One was impressed with the suggestion of edema of the orbit by the boggy appearance of the lids, the venous stasis, chemosis and prolapse of conjunctiva, and the limitation in excursions of the globe.

In view of the negative exploratory findings by the earlier Kronlein operation very competently done, one hesitated to explore the orbit, and only the palliative measures mentioned were continued awaiting further evidence. His discomfort increased with greater exophthalmos which, after a few weeks, became evident also in the left eye. Based upon the excellent reports by Pfahler on *x*-ray therapy of orbital sarcoma, and also because of its possible influence on the fat tissue of the orbits, he was given deep *x*-ray treatment by Dr. Frank S. Bissell on July 16, 1928, to the right orbit; July 24 and August 20, to both orbits; and finally on September 13, to the left orbit. Each treatment resulted in *x*-ray sickness of a moderate degree, but had no effect upon the extreme proptosis. Because of threatening damage to the cornea, Mr. H. was readmitted to the Hospital on Aug. 3, 1928. Superficial infiltration of the right cornea had developed over its lower third, with ulceration just above the lower limbus over an area about 2×5 mm. Tarsorrhaphy was done and the condition temporarily controlled. However, the stitches pulled out after ten days, without lid adhesion and a Buller shield was then used, continuing local measures. The left fundus was unchanged, but the proptosis in the left eye had definitely increased. Both eyes were now treated with antiseptic ointment continuously, and a double Buller mask employed, this apparently affording sufficient protection and giving least discomfort. Infiltration and ulceration of the right cornea continued to increase and the lids were again sutured. The right eyeball finally perforated with intense pain, controlled by anodynes for a time. On September 15, obtaining consent to enucleate and to exenterate if necessary, tarsorrhaphy was done on the left eyelids, and the right eye was enucleated. Upon removal of the eye, definite irregular hard masses could be felt through the orbit to its apex, especially along the superior and internal recti, of the nature of which one could not be certain, and the orbit was exenterated.

The orbital tissues were submitted to Dr. M. Warwick, Dr. E. T. Bell, and later to Dr. Geo. T. Caldwell, whose report in brief follows: The eyeball has burst and is collapsed. Back of the eyeball surrounding it and attached to it are muscles which are greatly enlarged in size averaging from 1 to 3 cm. in thickness. No definite tumor mass can be made out: there is only degeneration of the immensely enlarged muscles, edematous fatty tissue infiltrated with lymphocytes, without evidence of any malignant process or of any tumor formation. One section consists of orbital fatty areolar and fibrous connective tissues. These tissues are unchanged except for the alterations produced in removal. The other section consists chiefly of a cross section of one of the ocular muscles. The muscle as seen grossly in the section is 9.5 mm. in diameter. At least ten small bluish areas are visible to the naked eye, situated mostly near the periphery of the muscle, and of pin-point size. Microscopically, one-half of the muscle is divided by coarse fibrous bands into bundles of varying sizes. Some of these are sudivided by narrow bands into smaller groups, while elsewhere each remaining muscle fiber is surrounded by a loose fibrous tissue, evidently mature, but with relatively fine intercellular fibers. The fibers so surrounded are in various stages of atrophy; some are shrunken to less than one-half of the original diameter leaving a clear space surrounding each shrunken muscle fiber. A few fibers have apparently disappeared leaving the areolar structure of the endomysium. The bluish areas visible grossly consist of dense accumulations of lymphoid cells and plasma cells. The compact masses are chiefly lymphoid cells and they are situated more in the less involved portion of the muscle. They surround a few of the muscle fibers. There fibers are small and atrophic while many of the surrounding fibers of the fasciculus are granular. Plasma cells are present in small numbers with lymphoid cells, and in addition form less compact masses in the fibrous tissue, or are scattered in the fibrous stroma about the smaller blood vessels. The nerve bundles which are incorporated in the section of muscle appear normal except for a few lymphoid and plasma cells in the surrounding fibrous and fatty tissues. There is relatively little invasion of the muscle tissue by fatty areolar tissue. The areolar structure is apparently due chiefly to the loss of muscle fiber leaving the endomysium intact together with the formation of new fibrous tissue having delicate intercellular fibers. Muscle atrophy with a low grade inflammatory reaction and formation of fibrous tissue are the outstanding changes noted, which warrants the diagnosis of Pseudo-hypertrophic Muscular Atrophy, with edema of orbital fat.

The sutures in the left eyelids held only one day and the subsequent history was very much like that of the right eye, with increasing corneal infiltration and loss of sight; there was little suppuration present, but the ulcer continued to extend notwithstanding faithful treatment, until a staphyloma developed and perforation occurred. Conjunctivoplasty was not done because it was believed that sutures would not hold sufficiently to protect the cornea. Under similar circumstances again, however, this would be attempted together with free horizontal incision of the lids at the orbital margins, repeated tarsorrhaphy, and liberal resection of the orbital fat. September 27, 1928, the left eye was eviscerated for relief of the intense pain. Even after this was done, and after taking Lugol's solution for several weeks, there was no great diminution of the exophthalmos after six months. There still remained some edema and protrusion of the conjunctiva with separation of the palpebral fissure although the lids could be closed. There had been no change in the physical condition. His B.M.R. on May 2, 1929, was minus eleven. This patient from mysterious causes, because of acute exophthalmos, developing eighteen months after subtotal thyroidectomy for toxic goiter, lost both eyes.

This case of delayed exophthalmos following successful thyroidectomy is not without precedent. Leo P. Zimmerman[26] recently reported eleven cases in which exophthalmos developed or became worse following thyroidectomy for relief of exophthalmic goiter. In a personal communication he writes, "In every instance, the patients were completely freed from all manifestations of thyrotoxicosis, and the basal metabolic rate was normal or below normal in every case. In fact, the almost regular association of hyperthyroidism with this phenomenon made us suspect a possible relationship. The exophthalmos was unilateral in part of the patients and bilateral in the rest. While in no case did the condition result in loss of the eye, in several of the patients there was considerable conjunctivitis, chemosis, epiphora, and blurring of vision. In one nineteen year old girl, who had had no exophthalmos at the time of operation, proptosis subsequently developed to a degree that permitted the upper lid to retract behind the eyeball. We were unable to ascribe a cause for the phenomenon, nor were we successful therapeutically in correcting the changes. Following the suggestion of Plummer, we have been treating them with full doses of thyroid substance and iodine, without, however, any striking results. Some of the patients seemed to respond somewhat to iodine medication. I am convinced that the occurrence of post-operative exophthalmos is not uncommon. Since reading this paper, I have been told of at least ten other cases observed in the practices of my acquaintances. Dr. A. J. Carlson suggested that the thyroidectomy had nothing whatever to do with the development of the eye changes; that they were probably dependent upon factors other than the thyroid gland; and that they would have developed whether the thyroid had been removed or not. This, of course, brings up consideration of the etiology of hyperthyroidism which I am unprepared to go into. Benedict[27] mentions six cases coming to his attention with increase in exophthalmos after thyroidectomy, with loss of one or both eyes.

Hensen[28] reports a case in which no cause was found for progressive exophthalmos, the patient dying of cardiac insufficiency. There were no evidences of Basedow's disease. The B.M.R. was not tested. Pathologically "the orbital adipose tissue and the ocular muscles at both sides were unusually rigid and difficult to cut with scissors." "The muscles showed a cicatrous surface on cross section. The large muscle fibers were replaced by indurated connective tissue in which were found generous infiltrations of small cells at the edges of which were numerous plasma cells. Microscopically, therefore, it was a matter of permeation of the entire orbital tissues, particularly the musculature, with lymphocytes and plasma cells." The cause of the orbital infiltration Hensen could not determine, but attributed it to inflammatory metastasis from some remote focus, possibly in the gastro-intestinal tract. Pathologically his case much resembled the findings in my own.

DeRuyter[29] under the title "Eine neue Art von Exophthalmos" reported a quite similar case of malignant double exophthalmos. There were none of the usual clinical signs of associated goiter dysfunction and this was excluded although the B.M.R. was not tested. Stimulation of the sympathetic was ruled out because of absence of dilated pupils. Every conceivable cause was considered but none was found to explain the persistent exophthalmos. The subsequent history is not given.

Edgar S. Thompson[30] believes the intractable low-grade superficial keratitis sometimes accompanying exophthalmos is due to interference with the circulation at the apex of the orbit, to which is added desiccation and infection when the cornea is no longer well covered by the lids. To this is added circulatory stasis and the effect of unnatural lid pressure. He regards sudden exophthalmos as much more dangerous than slow protrusion. The sudden onset of edema of the orbit, especially following a thyroidectomy, would seem to be accounted for by some extreme influence in the cervical sympathetics. When it occurs it demands heroic surgical measures. These measures are canthotomy, tarsorrhaphy, removal of orbital fat, section through the skin of the base of the lids as suggested by Harmon, and protection of the cornea by conjunctivoplasty. In extreme cases one may completely divide the muscle of Muller at its attachment to the upper tarsal border or even to decompression of the orbit by removal of the temporal orbital wall as suggested by Kuhnt.[31] He states that he did not employ this latter measure until the destruction of the cornea actually threatened, inasmuch as this measure deprives the eye permanently of

important protection and might impair function of the external muscle.

SUMMARY

In this article the author reviews some of the eye signs of exophthalmic goiter and the theories for the occurrence of exophthalmos. A case is mentioned in which ocular symptoms occurred without other signs of goiter; also a remarkable case in which both eyes were lost from exophthalmos eighteen months following successful operation for goiter without any eye symptoms at the time of operation or during the interval.

BIBLIOGRAPHY

1. Brams: Am. Jour. Ophth., 1922, 609.
2. Halloway: Jour. Am. Med. Assn., 1929, 23.
3. Claiborne: Ophth. Sec., Am. Med. Assoc., 1920, 56.
4. Zeeman: Am. Jour. Ophth., 1929, 143.
5. MacCallan: Lancet, 1922, 1066.
6. Wilson: Am. Jour. Med. Sci., 156:553.
7. Moore: Lancet, 1920, 701.
8. Fisher, C.: Trans. Am. Ophth. Soc., 1921, 129.
9. Tilley: Ann. Surg., 1920, 647.
10. Landstrom: Jahres Bericht f. Ophth., 1907, 472.
11. Collins: Bowman Lecture, Tr. Ophth. Soc. U. Kingdom, 1921.
12. Krause and Frund: Abst. Zeitsch. f. Augenh., 1912.
13. Whitnall: Anatomy of the orbit, 1921, 296.
14. O'Day: New York Med. Jour., 1920, 709.
15. Bulson: Ophth. Sec., Am. Med. Assoc., 1920, 57.
16. Jaboulay: Lyon Medical, 1911, 501.
17. Mayo, C. H.: Jour. Am. Med. Assn., 1914.
18. DeSchweinitz: Relation of cervical sympathetic to the eye, 1904, 25 and 41.
19. Uverricht: Berlin Klin. Wchnschr., 1925, 878.
20. Sattler: G. S. Handbuch, 132.
21. Von Graefe: Berlin Klin. Wchnschr., 1867, 319.
22. Saenger and Baer: Erganzungsband zur Neurologie des Auges., 1927, 53.
23. Juler: Tr. Ophth. Soc. U. Kingdom, 1913, 58.
24. Coulter: Tr. Ophth. Soc. U. Kingdom, 1913, 69.
25. Paton: Tr. Ophth. Soc. U. Kingdom, 33:69.
26. Zimmerman: Personal communication, 1929. Also Am. Jour. Med. Sci., appearing after this article was written. July 1929, 92.
27. Benedict: Jour. Am. Med. Assn., 1928, 95.
28. Hensen: Ztschr. f. Augenheilk, 5:73.
29. DeRuyter: Arch. f. Augenheilk, 90:231.
30. Thompson: Am. Jour. Ophth., 7:27.
31. Kuhnt: Ztschr. f. Augenheilk, 1912, 333.

THE U. S. PHARMACOPEIAL CONVENTION

The Council on Pharmacy and Chemistry has issued a report calling attention to the call for the appointment of delegates to the United States Pharmacopeial Convention. The Council urges all the organizations which are entitled to delegates to select persons who are noted for high ideals, for breadth of vision, for sane understanding, and for sound judgment, as well as for technical knowledge, men who are fitted by temperament and training to collaborate, to help by deed and by counsel to keep the United States Pharmacopeia a work in which American medicine and American pharmacy may feel a just pride; a work that fairly reflects modern medical and pharmaceutic science; a work that is conservative of the best of the past, and progressive, constructive, sensitive to the best of the new. The Council discusses the character of the work of revision and the men required for this work. It points out that the selection of drugs to be admitted to the Pharmacopeia must be determined primarily by their therapeutic usefulness; that these are medical matters, and therefore fall within the technical province of the physicians of the revision committee; and that the definite recognition of this principle in the last revision contributed notably to its success and should be continued. The Pharmacopeia should be a working manual of the present era and not an antiquarian museum. New drugs should be admitted freely when their therapeutic usefulness appears established, and some old drugs which have fallen into neglect or disrepute should be omitted. The policies of the present revision have earned for the Pharmacopeia "the sanction of the medical community and of the public" and may safely be continued. (Jour. A. M. A., September 28, 1929, p. 989.)

PROGRESS IN KNOWLEDGE OF GOITER WITH PARTICULAR ATTENTION TO SURGICAL TREATMENT*

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WITHIN recent years evidence has been unmistakable of a significant change in the attitude of the medical profession toward the goiter problem. The former state of general indifference, probably fostered by the belief that the solution of this problem was the duty of a limited group of specialists, has been supplanted by one of widespread active interest in acquiring accurate knowledge of the diseases of the thyroid gland and their treatment. Nearly every phase of the problem is now being eagerly attacked by a steadily increasing number of investigators. Illustrative of this are: the numerous surveys of the incidence of goiter; study of its prevention, and the institution, in schools, districts and states, of prophylactic measures sponsored by public health authorities; the organization and rapid growth of clinics for the observation and treatment of goiter; the great increase in the number of surgeons devoting full or partial time to the operative treatment of goiter; the development and growth of metabolic and research laboratories for the study of goiter; the increase in the number of articles and lectures on goiter, and the organization of medical societies for the study of goiter. These as well as other facts show conclusively that the profession has been aroused and in turn has taken a more intelligent interest in educating the public on this subject. This awakening of interest, with the consequent dissemination of knowledge concerning the diseases of the thyroid gland, has played a significant part in the recent advances made in this field of medicine. These advances have been particularly apparent in the prevention of endemic goiter and in the improved immediate and end-results of the surgical management of toxic goiters consequent on early diagnosis and treatment.

The progress made in the treatment of goiter during the last decade has been stupendous, greater than in any twenty-five-year period of its history, and the medical profession has much of which to be proud. Yet, the total knowledge of the thyroid gland and its diseases, when considered in relation to the magnitude of the whole goiter problem, shrinks to insignificant proportions. The seriousness and importance of the problem can be measured, to some extent, by the prevalence of goiter and by the effectiveness of the means of prevention and treatment.

According to numerous surveys, carried out for the most part by public health officers in various districts in the country, and according to the records of general examinations of youths in the World War, there is an incredibly high incidence of goiter in this country. This varies in different localities; broadly speaking the disease is more prevalent in mountainous and intermountainous regions than on the coastal plains. The scope of this paper does not permit full discussion of this phase of the question, but I wish to allude to two reports which give some concrete conception of the prevalence of goiter. In a statewide survey of Utah, Wallace and Beatty examined 110,086 school children, representing 80 per cent of the total school-going population, and found, in 32 per cent of the boys and 54.5 per cent of the girls, some degree of enlargement of the thyroid gland. From an examination of adults in the areas where goiter is most frequent, they estimated that the percentage of enlargements that spontaneously disappeared was very small, perhaps less than 20 per cent for male children, and less than 10 per cent for female children. Similar surveys of school children in other western and midwestern states disclosed varying percentages of enlargement of the thyroid gland, all astonishingly high. The publication of the results of the examination by the Draft Board served a useful purpose not only in proving that a high incidence of goiter prevailed in certain states, but in demonstrating that no state was free from goiter. For instance, of the men examined from the state of Minnesota, eleven out of every thousand had some form of goiter. Since the ratio of the incidence is one male to three or five females, it is estimated, on the as-

*From the Division of Surgery, The Mayo Clinic, Rochester, Minn. Read in symposium before the Minnesota State Medical Association, St. Paul, May 13 to 15, 1929.

sumption that the same relative distribution of goiter exists in the female, that twenty-two to thirty-three persons out of every thousand of the population of the state of Minnesota have goiter. The extent of the problem may be viewed from another angle. In the last decade there has been an enormous increase in the number of surgical operations on the thyroid gland. This has not been confined to clinics situated in goitrous areas, but to those in districts which formerly were supposed to be nearly free from goiter. In the last seven years in The Mayo Clinic the percentage increase of patients operated on for disorders of the thyroid gland has been fifty-six and undoubtedly a similar percentage increase has occurred in other clinics where the operative treatment of goiter has been stressed.

In the past, unnecessary bewilderment and confusion have existed in the minds of the profession, and of the laity, with regard to diseases of the thyroid gland. This has been owing to the lack of uniform nomenclature and classification. The clinical classification of Plummer, simple yet comprehensive, is the one now most widely accepted and it is steadily gaining adherents. It is to be hoped that the time soon will arrive when this or some other equally simple classification will be generally adopted by the medical profession and understood by the laity, so that the diseases of the thyroid gland may be discussed with clarity. Plummer classifies these diseases as: (1) diffuse colloid goiter; (2) adenomatous goiter without hyperthyroidism; (3) adenomatous goiter with hyperthyroidism; (4) exophthalmic goiter; (5) myxedema; (6) cretinism; (7) thyroiditis; (8) malignant and (9) congenital anomalies. I shall confine myself here to a brief outline of certain phases of the subject which I believe are not clearly understood by many physicians. For convenience I shall divide my subject into problems related to colloid and adenomatous goiter and those related to exophthalmic goiter.

DIFFUSE COLLOID GOITER AND ADENOMATOUS GOITER

From long usage the term "endemic goiter" or "simple goiter" has come to include the two forms: diffuse colloid, and adenomatous or nodular goiters. These two broad types have certain significant similarities, the age at onset, the geographic distribution in areas in which the water supply is low in iodine, and the almost complete control of incidence by the adequate prophylactic administration of iodine. On account of such similarity, it is presumed that the etiologic factors are the same. Certainly deficiency of iodine is the basic factor in the cause of the disease. There may be other contributing factors, such as infection, food-deficiency, the physiologic phenomena associated with rapid growth, menstruation, pregnancy, lactation, and the like. Congenital origin accounts for a small percentage. In 1917, Marine, David and Kimball, as a result of an intensive study of school children in Akron, Ohio, demonstrated conclusively that endemic goiter could be prevented by supplying the body with an adequate amount of iodine. Numerous workers have since confirmed these observations, so that today there can be no reasonable doubt as to the efficiency of the method in preventing endemic goiter. Organized work in the prevention of goiter, however, has proceeded slowly, and today only seven states, New York, West Virginia, Ohio, Michigan, Utah, Oregon and Washington have taken up the work as a program of state health. In many states and communities situated in the goiter belt, organized prophylactic measures are not being carried out. This apparent neglect is accounted for partly by the confusion existing in the minds of the medical profession with regard to the possibility of inducing hyperthyroidism in persons with long-standing goiter if iodine were administered to the whole community. There is considerable historic background and some confirmatory evidence that the administration of iodine, in large doses, to this type of patient may initiate hyperthyroidism. It has also been contended that the general use of iodine in prophylaxis, even as small an amount of iodine as is contained in iodized salt (one part of potassium iodide to 5,000 parts of salt) is sufficient to cause harm. As evidence of this contention cases are cited in which the hyperthyroid status was induced by the taking of iodized salt. Obviously this is not convincing, for in many more similar cases in which iodine has not been given hyperthyroidism has developed. In a recent article Kimball reported the result of a study of goitrous persons in several counties in Michigan in which iodized salt has been used by a large part of the population for from one to four years. He examined 1,229 patients with goiter and classified

them in four groups: (1) those who had used iodized salt, 655; (2) those who had not used iodine in any form, 419; (3) those who had used iodized salt and other forms of iodine, 114, and (4) those who had used other forms of iodine only, 41. The percentages of hyperthyroidism in the four groups were: 4.1, 55.5, 17.5, and 20, respectively. Thus it may be noted that the largest percentage of hyperthyroidism was in the second group, in which iodine had not been used in any form. Certainly there is no evidence here of any causal relationship between the administration of the small amount of iodine contained in iodized salt and the induction of hyperthyroidism. In view of the fact that the effectiveness of administering small amounts of iodine to prevent colloid and adenomatous goiter has been demonstrated conclusively and that there has been no proof of danger connected with its use, it is obvious that the time has arrived for the medical profession to sponsor an organized program of the prevention of goiter throughout the country.

Diffuse colloid goiter.—The diffuse colloid type of goiter occurs in adolescence, usually does not produce symptoms, and often the goiter disappears spontaneously during the third decade of life, or earlier if the patient is treated with iodine or thyroid extract. Except from the viewpoint of prevention, diffuse colloid goiter does not present a great problem. Only for the goiter that attains enormous dimensions, that is associated with adenoma, or that persists in adult life, is surgical treatment recommended.

Adenomatous goiter.—The changed attitude of the profession toward the goiter problem is well illustrated in the newer conception of the potentialities of simple adenomatous goiter. Not many years ago, it was widely believed that, aside from disfigurement and possible tracheal obstruction, the presence of a nodular goiter need cause little concern. Very often the professional advice given to such a patient was: "Don't bother the goiter until the goiter bothers you," and very often after the lapse of years the patient returned to the physician on account of loss of weight, weakness and heart trouble as a result of hyperthyroidism. Even then, in many instances, the causal relationship between the goiter and the symptoms was not recognized, and the only advice or treatment given the patient was a prescription for digitalis. Today the patient should be told definitely that an adenomatous goiter will not disappear spontaneously and that it cannot be made to disappear by other than surgical means. Operation is accompanied by a mortality of less than 0.2 per cent and by low morbidity. Moreover, the chance of recurrence of adenomas if patients are operated on at the age of thirty or more is extremely small, probably less than 1 per cent. A large percentage of the so-called recurrences are not true recurrences in the sense that new adenomas develop, but are the result of the growth of adenomatous tissue overlooked by the surgeon at the time of operation. To retain the goiter entails certain risks—namely, the development of hyperthyroidism, of malignant change and the production of tracheal compression, usually from extension of the growth behind the trachea or into the chest; any of these would definitely increase the surgical hazard.

Plummer has pointed out that in cases of adenomatous goiter there is a definite chance that hyperthyroidism will develop on an average of fifteen years after the appearance of the goiter. It is difficult to estimate accurately the proportion of patients with non-toxic goiters which later become toxic; to arrive at such an estimate would require repeated follow-up examinations of a large group of untreated patients with adenomatous goiter, over a period of years, until the result of the disease in the last survivor was known. In all the adenomas operated on in The Mayo Clinic the percentage of toxic adenomas has been increasing yearly. During the last six years (1922-1928) 6,195 operations were performed on patients with adenomatous goiters; of these, 2,576 (41 per cent) had toxic adenomas. It is apparent that this is not an accurate estimate of the incidence in general, but to me it would seem conservative to estimate the occurrence at more than 25 per cent. Then if, in a case of non-toxic adenoma, there is a chance of only one in three or four of the development of hyperthyroidism, why is it advisable to operate before the goiter actually becomes toxic? The answer is that delay may be attended by unnecessary risk. In most cases of adenoma the onset of hyperthyroidism is so insidious that often the patient does not realize a change in his condition until the heart or liver is affected; the operative risk is then increased and the prospect of ultimate cure correspondingly diminished.

The sum of knowledge concerning the rela-

tionship of adenomatous goiter to malignant disease of the thyroid gland can be expressed by the statement of a few facts. Data are not available to determine the relative frequency of malignant and of benign tumors of the thyroid gland, as extensive surveys of the incidence of both conditions in large, populous communities would be necessary. Some idea of this may be had from the registrations in clinics and hospitals. Obviously, however, this is not an accurate measure of conditions, since many of the patients with simple nodular goiter never seek medical advice, and all patients with carcinoma of the thyroid gland eventually come to the physician. In The Mayo Clinic, from 1910 to 1926, inclusive, the ratio of malignant tumors of the thyroid gland to all simple goiters (colloid and adenomatous) was 438 to 16,110 or 1 to 36.7 (2.7 per cent). Of the 276 patients with malignant disease of the thyroid gland who were operated on, 239 (87 per cent) presented unquestionable evidence that the malignant neoplasm originated in a preexisting goiter. Furthermore, as it is often impossible to make a clinical diagnosis of malignant disease of the thyroid gland while the tumor is still operable, that is, before it has invaded surrounding structures, so it is impossible to exclude the possibility of a malignant condition. Of the 276 cases in which operation was performed, the records show that the preoperative diagnosis was not suspected in 65 per cent.

Although the extent of the risk resulting from neglect of an adenomatous goiter cannot be accurately estimated, I believe that this danger is sufficient to be taken into account in formulating an opinion as to the advisability of the removal of a simple adenomatous goiter. In view of the exceedingly low operative risk and morbidity, and the very small incidence of recurrence after operation if patients are aged thirty years or more, and in the absence of specific contra-indications, I believe that operation is warranted in nearly all instances. Certainly if operation is not advised the patient should be under periodic observation, so that any change in the condition may be detected.

EXOPHTHALMIC GOITER

During the last ten to fifteen years the general problem relating to exophthalmic goiter has been greatly influenced by three factors: (1) the enormous increase in the incidence of exophthalmic goiter; (2) more knowledge of the disease in the possession of the profession and the laity, and (3) the tremendous improvement in its surgical management.

Within the last decade, statistics from goiter clinics have shown a large yearly increase in cases of exophthalmic goiter, far in excess of that of the other varieties of goiter. Thus, in The Mayo Clinic during the last five years, the percentage increase of patients with exophthalmic goiter has been over 100.

The cause of exophthalmic goiter is unknown. All evidence indicates that an intensive stimulus of unknown source, operating probably through the sympathetic system or the blood and acting on the entire gland, drives it to the point of an overproduction of an active agent. According to Plummer this agent is abnormal in quality as well as quantity and when in the tissues of the body it causes all the phenomena of the disease. The cause or nature of the stimulus, as well as the conditions under which it functions most effectively, are not known. Only scanty data concerning its etiology are available. From the report of the Draft Board, and from my personal observation of patients from different localities, I am forced to the conclusion that the incidence of exophthalmic goiter is high in those districts in which the incidence of endemic goiter is high. This analogy applies only in the United States. In Switzerland and certain other mountainous regions of Europe and India, the incidence of endemic goiter is very high, but exophthalmic goiter is comparatively infrequent. Colonel McCarrison of the British Army observed only a few cases of exophthalmic goiter in the native Indian; yet in some goitrous regions, the incidence of endemic goiter was extremely high. As already pointed out, deficiency of iodine is the most significant etiologic factor in the production of endemic goiter. Can deficiency of iodine be a factor also in the causation of exophthalmic goiter? If so, how can the dissimilarity in the high incidence of exophthalmic goiter in goitrous regions in the United States and its very low incidence in the goitrous regions of Europe and Asia be reconciled? Are there any outstanding differences between the people and conditions of life in the United States and Europe and India? The American people are living at a speed far greater than that at which the others live. The nervous and emotional strain and tension result-

ing from this is incomparably greater in the American people. It seems reasonable to speculate on the possibility that nervous tension, extreme worry, fright and other intense emotions may be the stimulus which, under favorable conditions, may drive the thyroid gland to the excessive activity that may result in exophthalmic goiter. Deficiency of iodine or infection may lower the resistance of the thyroid gland, thereby making its condition favorable for its characteristic response to the stimulus. In the United States the stimulus as well as the favorable conditions prevail; in Europe and India the stimulus is largely lacking.

The important factors that have contributed to the recent development of the surgical management of exophthalmic goiter have been the introduction of iodine in the preparation of the patient, improvement in surgical technic, and early diagnosis and treatment. Today, in order to appreciate fully the effects and the clinical significance of administering iodine to the patient with exophthalmic goiter under preparation for surgical operation, it is necessary to recall that before its introduction, in 1922, the surgeon was uncertain, in fully two-thirds of his operations, whether an unexpectedly severe and often fatal post-operative hyperthyroid reaction might ensue. Inability to foretell in which case a severe crisis would occur was the bane of the surgeon's existence, for these crises were the immediate cause of death in fully 50 per cent of the patients who died. To lessen the possibility of these reactions, the operation in stages was resorted to in 66 per cent of the cases; in many instances, procedures in three to five stages were performed within the period of three to eight months. This resulted in additional suffering and economic waste. Since the introduction of iodine, post-operative reactions have been eliminated, operations in multiple-stages are practically abolished, and the operative mortality rate is reduced to well under 1 per cent. Thus, in the last six years in The Mayo Clinic, since the pre-operative preparation has been perfected and standardized, more than 6,500 patients have been operated on with only sixty deaths, a mortality of 0.91 per cent.

Contributing in large measure to the improved immediate and end-results of surgical treatment has been the tendency for the patient to seek operation early in the course of the disease, before the development of irreparable visceral degeneration. The average duration of the disease in all patients operated on in 1910 was thirty-three and fifty-six hundredths months. Since then, the duration has gradually but definitely decreased, until in 1928 it was only fourteen and thirty-five hundredths months. To state it differently, the average patient with exophthalmic goiter in 1910 had the disease for more than two and a half years before submitting himself to operation, whereas in 1928 the patient had the disease for little more than one year. The effect of this shorter duration on the immediate and end-results of surgical operation has been very pronounced. Illustrating the influence of the duration of the disease on surgical mortality, I wish to point out again the statistics of The Mayo Clinic for 1926. There were 1,626 operations on 1,572 patients with exophthalmic goiter. Thirteen patients died, a mortality of 0.83 per cent. The average duration of symptoms of hyperthyroidism in the 1,572 patients was fifteen and nine-tenths months. Only one of the thirteen patients who died had symptoms for less than fifteen months. The average duration of the disease in the remaining twelve was thirty-eight months. Furthermore, there were 795 patients with exophthalmic goiter who had had the disease for twelve months or less. Only one died, a mortality of 0.12 per cent. The remaining 777 patients had had the disease for more than twelve months. Twelve of these died, a mortality of 1.5 per cent.

The cause of delay on the part of the patient in submitting to operation is frequently a belated or wrong diagnosis. An incredibly large percentage of the patients who come to The Mayo Clinic with exophthalmic goiter have not had a previous correct diagnosis. In some of these the symptoms are not clear cut and an accurate diagnosis can be made only after repeated tests and observations. In others, however, the diagnosis should have been clear, if the possibility of exophthalmic goiter had been considered in the differential diagnosis. Frequently exophthalmic goiter is not considered owing to the fact that the patient's chief complaint, such as loss of weight, cardiac and gastric trouble, or diarrhea, is in itself not suggestive of this diagnosis, and the patient does not present exophthalmos and a visible tumor of the neck. Exophthalmos is present in about 50 per cent of the patients with

exophthalmic goiter who come to the clinic and a tumor of the neck often is not visible. From student days most physicians have thought of exophthalmic goiter as a syndrome presenting certain cardinal symptoms such as exophthalmos, tumor, tremor, tachycardia and nervousness, and unless this combination in whole or in part is obvious, the idea of exophthalmic goiter does not occur to many of them. Instead, the disease should be conceived of as one of altered physiologic processes resulting in an increased rate of tissue metabolism. Then such symptoms as loss of weight, in spite of a good or an increased appetite, weakness, profuse sweating, intolerance to heat, and tachycardia will at once suggest the diagnosis, even though some of the more distinctive signs, such as tumor, exophthalmos and staring eyes are not present. From available data it would seem that, until the cause of exophthalmic goiter becomes known, further improvement in the results from surgical management is dependent on early diagnosis and treatment.

BIBLIOGRAPHY

1. Kimball, O. P.: The efficiency and safety of the prevention of goiter. Jour. Am. Med. Assn., 1928, xci, 454-460.
2. Wallace, James, and Beatty, T. B.: Goiter survey. Utah State Board of Health, 1924-1925.

THE NICOTINE CONTENT OF TOBACCO

About a year ago, the Connecticut Agricultural Experiment Station published a report which showed that the claim that certain tobaccos has been "denicotinized" was largely without foundation, for it was found that there were, among ordinary tobaccos, brands in which the nicotine was either not in excess or was actually lower than that present in the processed tobaccos, sold under the implied claim that they were practically free from nicotine. The Station has now issued a further report giving the results of the analyses of tobaccos of both the processed and unprocessed types. Altogether, eleven brands of unprocessed pipe tobacco have been analyzed and found to have an average total nicotine content of 2.04 per cent; four brands of so-called denicotinized pipe tobacco gave an average total nicotine content of 1.3 per cent; ten brands of ordinary unprocessed cigars gave an average total nicotine content of 1.51 per cent, while seven brands of processed, or so-called denicotinized, cigars gave an average total nicotine content of 0.95 per cent. In the cigaret field forty-six analyses were made of ordinary unprocessed products, giving an average total nicotine content of 1.77 per cent, as compared with 1.09 as the total nicotine content of twelve so-called denicotinized brands. From this work it can be seen that while some of the so-called denicotinized products contain less nicotine than the ordinary unprocessed brands of the same class, they still contain material quantities of nicotine. The main difficulty in determining whether or not the claims made by manufacturers of so-called denicotinized tobacco products are reasonable lies in the failure to know the amount of nicotine in the various tobaccos *before* they were processed. However, this work permits the tobacco user to arrive at some worth-while conclusions on this point. It should not be forgotten, also, that nicotine is probably not the only harmful element in tobacco smoke, and that Dixon has reached the conclusion that moist tobacco produces much more serious effects than dry tobacco, and has even suggested that the water content of tobacco might be a more harmful factor to the smoker than the nicotine content of the tobacco, and that the condition of the tobacco and the form in which it is smoked are probably more important factors in determining the amount of nicotine that the smoker gets than is the actual nicotine present in the original tobacco. (Jour. A. M. A., September 21, 1929, p. 938.)

THE TREATMENT OF TOXIC THYROID WITH RAYS OF SHORT WAVE LENGTH*

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ONE of the most interesting chapters of modern medicine is woven around the treatment of the toxic thyroid. Before 1903 the treatment of the toxic thyroid was almost entirely medical. Since 1903 it has been largely surgical. From about 1910 to the present time, radiation, either by *x*-ray or radium, has been advocated and is slowly but surely gaining ground.

The progress which radiation treatment has made has been proportional to the opportunity which it has had to prove its efficiency. In this country it is customary to operate upon the gland, while in Europe the majority of the cases receive therapy by radiation. The advocates for radiation number some of the best men in Europe. Rowden states that in the last ten years only seven toxic thyroids have been operated upon in the city of Leeds. According to Holtzknecht, sixty per cent of the cases of Basedow's disease are cured by roentgen therapy, while another twenty to thirty per cent are without doubt improved. Schwarz advises against any therapy except radiation and says that *x*-ray produces the best results. Pordes summarizes his experience by saying that all thyroid toxicoses respond to *x*-ray therapy. Gudzent prefers radium and believes that it is the therapy of choice in the treatment of this disease.

Statistics show that about the same number of patients are benefited by radiation as by surgery. Such statistics are compiled from all sources, both in this country and abroad, and are the representation of general surgery and radiation and not the results from a few selected groups. They show that by either method of therapy about seventy-five or eighty per cent are cured.

Rays of short wave length are derived from two sources, the roentgen ray and radium. Choice between them depends upon the familiarity of the operator with them and the amount of radium available. In biological action they are approximately alike. The intensity of the radiation depends upon the source of supply. For use at a distance, such as is necessary in the treatment of the thyroid gland, an immense amount of radium is required to produce the same amount of radiation that is available from an ordinary roentgen apparatus delivering a current from a potential of 200 kilovolts. In quality, the gamma rays from radium range from 0.01 A.U. to 0.10 A.U., while those from *x*-ray range from 0.10 A.U. to 0.20 A.U. The depth of penetration of roentgen rays exceeds that of radium.

Radium is applied by the method known as the "radium pack." The pack consists of needles or tubes containing ten milligrams each of the radium element. They are so placed that each one is one centimeter from its fellow and they are of sufficient number to cover the entire area of the gland to be radiated. The whole is placed at a distance from the skin of two centimeters and an additional filter of one millimeter of brass is interposed between the pack and the skin. The pack is left in place from ten to sixteen hours, depending upon the severity of the case. The average time is twelve hours. The pack has the advantage of being available for the bed patient and may even be taken to his home. When he can be moved, *x*-ray therapy is preferable because it consumes less time and is less expensive.

In using *x*-ray, we apply 225 "r" units of a quality of 0.16 A.U. over the entire thyroid and upper part of sternum, from the anterior direction. Such a treatment is repeated every two or three weeks, depending upon the basal metabolic rate. Such radiation may be given indefinitely without producing any injury to any normal tissue which it may touch except the vocal cords. These must always be protected with lead. The radiation loss of seven per cent per day precludes the possibility of doing the normal tissue any harm.

The metabolic rate is the criterion for the amount of radiation employed. The higher the rate, the more quickly the patient responds. We feel that it is inadvisable to treat patients whose rate is below a plus twenty. It is worthy of note that hypothyroidism is more likely to occur from radiation than from surgery. A careful check

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of the metabolic rate should be made before each treatment during the time the patient is receiving radiation therapy. After treatment, the rate immediately rises and in some cases the increase is as much as forty per cent. This reaction gradually subsides and in a week or ten days the reading is lower than the pretreatment reading.

The slower the fall in the basal metabolic reading, all other things being equal, the better the result. A few patients show no fall and after three or four treatments such patients are recommended for operation unless they have been previously operated upon. If they have had an operation an additional treatment or two, with *x*-ray of a different quality, or with radium, will often prove beneficial and turn the tide in their favor.

The action of rays of short wave length upon the toxic thyroid is simply that of decreasing the activity and retarding the function of the pathological cell. The cell is destroyed only during the process of division, while the effect upon the mature cell is that of lessening its secretion. Activity and function are not alike and the amount of either is not revealed by microscopic examination, unless the tissue be living. The determination of such function is made before death and is best represented by the patient's condition. The results of radiation upon the gland have often been described and vary from no visible change whatever to a marked fibrosis. Marked fibrosis may be the natural result of the disease itself. To prove that it is the result of radiation is very hard indeed. The advance in radiation equipment and measuring instruments has made it possible to produce all the beneficial effects necessary to hyperactive and diseased cells without affecting the normal surrounding tissue and skin.

The only contraindication to radiation therapy is a large gland showing definite compression symptoms. Such a gland should be removed.

An example of what may be accomplished by radiation is shown in the following typical case:

A married woman, forty-eight years of age, who had passed the climacterium four years previously, had been perfectly well until eight months before coming under observation nine years ago. She was complaining of shortness of breath, rapid pounding heart, loss of strength, nervousness, loss of appetite and some loss of weight. The pulse was 140, basal metabolic rate plus 60, blood pressure 180 over 110. There was a slight systolic murmur at the apex, a moderate enlargement of the thyroid gland and some exophthalmos. She was exhausted from walking up a moderate incline a distance of half a block. She refused operation and was referred for radiation therapy. She was given one treatment each three weeks, of the quality of radiation as outlined above, for five treatments, and an additional treatment after an interval of two months. She reported at regular intervals for four years and was found to have remained in perfect physical condition. A check of her condition last January showed that she is still well.

Between 1921 and 1925 we treated sixty patients with the following results. One patient died of intercurrent disease after slight improvement; three received no relief; five, no permanent relief. The remaining fifty-one patients are alive and well, with the exception of one who has since died of pneumonia, four years after treatment for the goiter. The apparently cured cases after five years number eighty-five per cent.

In conclusion, we feel that the patient with toxic thyroid should be given the advantage of radiation therapy since the treatment causes no pain, no scar, little or no loss of time from hospitalization, no operative mortality and, in addition, because the results are as good as by any other method of treatment.

DISCUSSION OF SYMPOSIUM ON GOITER

Dr. Elliott P. Joslin (Boston, Mass.): Mr. Chairman and Members of the Society: When a patient with a decompensating heart comes to me, the first thing I look for is to see if there is a possibility of that patient having hyperthyroidism as well; if to the old heart disease hyperthyroidism has been added and the extra strain has decompensated the heart, I can send that patient to the surgeon and the patient will get better. When I see a patient with a large thyroid gland and I suspect an adenoma, I send the case to Dr. Lahey for its removal, provided he confirms the diagnosis, because I don't want any of my patients to die of cancer of the thyroid. As for my diabetic patients whom I expect to live forever, they go first of all.

Third, if the patient is a diabetic I always scan him as closely as possible to see if there is any chance of hyperthyroidism, because hyperthyroidism makes a diabetic worse. Formerly they were the ones that died. Today, if they can be operated on, they are not cured, none of them that I have seen in this group has been cured, but they are so much helped that one welcomes this coexistent condition, just as one is hopeful about the gallstone diabetic.

If I send all the cases where there is a possible heart disease and all the adenomas and all the diabetics where there is hyperthyroidism to the surgeon, it doesn't leave much for the medical men, and I don't think it should leave much for the medical men. I do think it is very interesting that some doctors use other methods. It is fine that we don't all do the same thing, because that gives opportunity for new ideas.

THE EARLY DIAGNOSIS OF HEART DISEASE*

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THE past twenty-five years have witnessed strides in the diagnosis and treatment of heart disease, the extent of which has been inadequately realized and the importance of which has certainly not been reflected in a corresponding improvement of service on the part of the profession to the multitude of idividuals so unfortunately afflicted. This situation is the more forcibly brought to our attention by studies of mortality statistics which show that while in later years there has been a gradually decreasing mortality from diseases caused by known bacteria, indicating the field of greatest medical progress, the death rate from cardiovascular disease has been rapidly increasing, with no signs of abatement. In 1922, circulatory disease caused more deaths than all infectious and preventable diseases combined, and the death rate in the cardiovascular group has mounted from 122 per 100,000 in that year, to 194 per 100,000 in 1927.

Life insurance statistics[1] are of interest in this connection. Of all applicants declined for life insurance, 50 per cent is on a basis of circulatory disease, the majority of which is in individuals unaware of any trouble. In addition to this, the difficulty of early detection of these disorders is strikingly shown by the fact that the mortality from cardiovascular disease is as high in early policy years as in later, and is the same in large policy holders who are subjected to examination by several physicians. This serves only to emphasize the difficulty in diagnosing trouble of this nature early. Another fact, which is especially applicable to Minnesota, is that the rate of increase of the incidence of heart disease is much more rapid in rural than city communities, the rural figures including towns of 10,000 or less. No satisfactory explanation can be offered for this situation, but it shows the increasing importance of this problem to the country physician as well as to the city doctor, the faster living of whose patients might seem to make them more subject to circulatory disease.

These facts serve to emphasize the importance of this group of patients which we all meet daily in practice. Wherever medicine has progressed in the alleviation of suffering it has been due to efforts toward prevention and the early diagnosis of disease. Prevention is closely related to the subject of etiology. In spite of our progress, the cause of cardiovascular disease is still indefinitely recognized, and while prophylaxis with its attendant care of etiologic factors is the first essential in reducing this great morbidity, our shortcomings here force upon us the necessity of early diagnosis, the wide spread knowledge of which will be of inestimable value in the arrest of incipient disease and the prolongation of life.

In the consideration of early diagnosis several general factors will bear emphasis. Unlike the kidneys, lungs and other organs, the heart is a solitary worker,[2] with no other structure able to take up its function, even vicariously. However, as if in consideration of this, the heart has been endowed with a normally large reserve strength, available on short notice, and giving to it a marked flexibility of action which obviates the probability of embarrassment, even under unusual strains. On the other hand, the extreme liberality of blood supply to the myocardium, many times as great as that of other organs, together with the fact that the heart is exposed to a multiplicity of bacteremias and toxemias, makes evident the dangers to which the heart is subject. This also shows the possibilities for great myocardial embarrassment when the blood supply of the myocardium is affected through general or local arterial disease. An important point to recognize is that the severity of a complaint is seldom related to the seriousness of the underlying disease, and this makes obvious the hazard of attaching undue significance to a single sign. Rather must thorough inquiry be made, and the sign or symptom evaluated with regard to the context of the clinical story.

Far and above all, in early diagnosis in heart disease is the study of symptoms. These are due to an accumulation of heart protests,[5] nearly always ignored at their inception and insufficiently troublesome to attract attention at that time. They practically always follow an over-stepping of the heart muscle reserve and usually occur in

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association with factors of increased myocardial demand. Particularly true is this of adults, but it must be recognized that children[3] may carry these symptoms much longer uncomplainingly, and signs of greater obscurity here often result in the child undergoing examination. It is useless to ask the child regarding the earliest symptoms, because while they have been present, they are accepted by it as normal sensations. There are, however, the observations of several factors in the child that doesn't feel well, which should lead to further investigation of the heart side. Epistaxis while of course a somewhat common occurrence, is not infrequently associated with heart abnormalities. Indigestion or vague abnormal discomforts, and headaches are frequently early signs. Anemia of a secondary type is often found in children with chronic cardiac disease. They seem especially prone to it, and where no other cause can be found for it, and it is especially resistant to treatment, the suspicion of a cardiac origin should be entertained. The general activity and nutrition in children are always essential to investigate. They should be watched at their play for signs of earlier fatigue than their playmates, and for avoidance of certain types of physical exertion which they have found especially tiring. Much less strenuous forms of recreation will be indulged in, and their reduced activity at home is often a clue, being evidence of unconscious self protection which is seldom or never adequate. The reduced appetite which sometimes occurs, together with the possible anemia, leads to a state of undernutrition which always demands study. These suggestions regarding children hold true for either the acquired or congenital types although the anemia is usually associated with the acquired type.

However, the majority, by far, of patients involving this problem present themselves in later life and the predominating importance of symptomatology here leads us to discuss the following symptoms[4, 5] of fatigue, pain, dyspnea, palpitation, cough, and abdominal symptoms. These do not make their appearance in the same order in different individuals but any one of them may constitute the first appreciable warning and serve to direct the patient to the care of the physician.

SUBJECTIVE SYMPTOMS

1. *Fatigue.*—Undue, or unusual fatigability is one of the earliest signs, and one which is frequently long ignored by the patient. He believes he is slowing down, that with the advance of years he is entitled to this feeling and it is only when it becomes really embarrassing to his activities and progressively aggravated that he consults the physician. This fatigue may be associated either with muscular or mental work, both of which will sooner or later bring on other symptoms. It is provoked by an activity which the patient could formerly perform with ease, and while it will usually occur in close association with the effort, it may be considerably delayed in its appearance. Its cause may be difficult to determine, but is usually vascular stasis, mild asphyxias, anemia, retention of waste products, or vascular changes.

2. *Precordial Pain.*—It is far beyond the scope of this paper to attempt any adequate discussion of heart pain or distress. However, the subject is an important one, and the not infrequent occurrence of it early makes its origin and evaluation necessary. Pain is a sensation of the greatest degree of variability. It may manifest itself only as a vague precordial or substernal oppression or constriction, or it may be much more severe and distressing, making the patient feel as though he had a continuous weight over the chest. The complaint is one of heaviness or pressure, leading at times to the sensation of choking. On the other hand, the pain may be sharp or lancinating in character, varying from degrees of mildness hardly noticed to the severe pains of angina pectoris and coronary thrombosis, often untouched by large doses of narcotics, the most excruciating possible. Of particular significance are the conditions under which these distresses occur and their radiations. Their occurrence after eating, or moderate or severe exercise, or when walking in a cold wind, are all very suggestive of the cardiac origin of the distress. These conditions impose greater degrees of strain on the heart than its limited reserve will permit without complaint, and such provocation of pain or distress must be regarded as cardiac until proven otherwise. The radiation of chest pain is also often of great value in determining its significance. Either the dull or the lancinating types may radiate, most typically from the region of the apex over the left chest wall, to the sternum, or to the left, occasionally the right, shoulder and arm. It may also go

through to the interscapular region of the back, or the neck on either side and it should be noted that occasionally the radiated pain is more severe than that of the primary seat. Not infrequently cardiac pain is considerably delayed in its appearance after a provocative cause, sometimes occurring hours later when at rest, and occasionally awakening the patient from sleep at night.

It must not be forgotten that similar types of pain are produced by a variety of conditions, as mediastinitis, pleurisy, chest tumors, neuralgias, neuritis, etc., and a careful examination is always necessary for a correct diagnosis.

3. *Dyspnea.*—Shortness of breath on exertion or after meals, especially when progressively increasing in severity, is frequently the first sign of heart damage. It means that the limits of cardiac reserve for that individual have been overstepped and is significant of early heart failure. Its occurrence in other conditions as anemias, or diseases of the lungs or mediastinum, makes it necessary to carefully eliminate these. When no other cause can be found and the symptom occurs alone, the patient should be treated as having incipient heart disease. Attacks of dyspnea at night occasionally mark the course of cardiac patients, and are at times the cause of the first complaint. These usually occur in elderly patients and are quite characteristic of heart disease where asthma and its typical expiratory wheezing can be ruled out. They are sudden temporary heart failures, usually with orthopnea and with or without pulmonary congestion.

4. *Palpitation.*—Palpitation is a less important symptom of heart disease because so prevalent in nervous individuals. All types of palpitation, where heart disease or heart damage can be eliminated, are due to acceleration of heart rate, whatever may be the cause. It occurs frequently enough as an early sign of cardiac embarrassment to warrant studied consideration. It is especially significant of cardiac origin when induced by exercise persistently or when associated with irregularity, at which times it is usually the response of a damaged heart. Histories of attacks of palpitation, sometimes expressed as flutters, are not infrequently periods of paroxysmal auricular fibrillation, paroxysmal auricular flutter, or paroxysmal tachycardia which may be the only complaint and yet one of great importance.

5. *Cough.*—Cough, without obvious good cause, coming on during or after eating or exercise, or with fatigue, should be considered as of cardiac origin. Such coughs are usually due to lung congestion, or the pressure of a great vessel on a laryngeal nerve, and while they are usually somewhat late in the picture, occasionally are complained of by patients who ignore earlier warnings of a different character.

6. *Abdominal Symptoms.*—Certain abdominal complaints not infrequently introduce a cardiac picture. Any patient suffering from loss of appetite, epigastric fullness, distress or pain, abdominal distension, gas or bloating, should be carefully investigated from the heart side, especially those past middle life and in whom the picture is not perfectly clear as indicating the abdominal origin of the complaints. This group of cases is usually insidious in its onset and further investigation often reveals the true cause of the condition. A more severe abdominal pain, just inferior to the sternum, excruciating and often not relieved by narcotics, is that of coronary thrombosis. It is often the first indication of a serious heart condition, and only too frequently results in operation for a supposedly acute abdominal condition, with almost inevitable fatality. This condition should always be borne in mind in severe epigastric pain. Angina pectoris may also manifest itself by a severe epigastric pain, and must be excluded in diagnosis, the therapeutic response to the nitrites being often helpful in such patients.

OBJECTIVE SIGNS

While the great importance of symptoms is not shared by physical signs in early heart diagnosis, diagnosis, there are certain findings that often point to the proper direction of investigation. A peculiar pallor, difficult to describe, rather grayish in shade, not associated with anemia, is often suggestive. Cyanosis is usually evident and in a patient not acutely ill, is usually on a cardiovascular basis, congenital or acquired. Pupillary inequality should arouse the desire to exclude aneurysm which frequently accounts for it, as also an inequality of pulses. A slight to moderate unnoticed edema of the anteromedial surfaces of the tibiæ is often an unnoticed early manifestation of heart disease, and where not accounted for on other etiologic basis should serve as a lead to cardiac investigation.

Arrhythmias may be early findings, and since it is recognized that an irregularity of any type warrants a complete cardiac investigation careful search should also be made for the underlying cause. Arrhythmias such as premature contractions or auricular fibrillation, transient or permanent may cause no symptoms in many individuals, or they may be associated with sensations of palpitation or flutter. Determination of heart size is often of value because an enlarged heart is always pathological, and while this is a subject for discussion in itself, it must be remembered that extreme difficulty is often found in the determination of moderate degrees of cardiac enlargement, especially when present in that prevalent type of drop heart in the visceroptotic which, according to Goldthwaite, comprises 50 per cent of our population. The limitations of the value of percussion, even in the hands of the expert, is shown in the discrepancy of such figures with those of the six-foot *x*-ray plate and only serves to emphasize the importance of this procedure in giving information concerning the heart.

SUMMARY

The importance of the early diagnosis of heart disease cannot be overemphasized. It is shown on all sides by an increasing array of evidence pointing to the progressively enlarging mortality and morbidity from this disease. It is becoming of greater importance to the general practitioner than ever before. Difficulties are at times encountered in that symptoms pointing toward it are often found in other conditions which must be ruled out. Of greatest importance is the taking of a careful history with especial stress laid upon the ferreting out of the subjective complaints of the patient, especially fatigue, dyspnea, precordial pain, edema, cough, and abdominal symptoms. Physical signs are of much less value early, but may point in certain instances the direction of probable fertile investigation. Only by painstaking work in this direction can we hope to alleviate the distress caused by this captain of the men of death.

REFERENCES

1. Dwight, Edwin M.: The next job in preventive medicine. Life Insurance Medicine: New England Mutual Life Insurance Co., Vol. 1, 1926.
2. Eyster, J. A. E.: Early diagnosis of chronic cardiac conditions. Ill. Med. Jour., xliii, 297 (April), 1923.
3. Griffith, J. P. C.: Heart disease in children. Internat. Clin., Philadelphia, xxxiv, 1, 1924.
4. Larson, H. N.: Preclinical stage of cardiovascular disease. Jour. Med. Soc., New Jersey, xxiii, 206 (May), 1926.
5. Smith, S. Calvin: The preclinical stage of heart disease. Jour. Am. Med. Assn., lxxxvi, 1902 (June 19), 1926.

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DISCUSSION OF PAPERS BY DRS. BORG AND BARRON*

Dr. S. Marx White (Minneapolis): The discussion of so broad a subject as that presented by these two papers is extremely difficult. Dr. Borg has given us some excellent suggestions about the difficulties of early diagnosis of the heart. Dr. Barron, in his encyclopedic presentation, has brought up so many things that one is sorely tempted to discuss them at length. However, I think the greatest value to one who discusses the paper, or attempts to discuss it, or to those who listen, might be an attempt to suggest two or three things brought out in the papers which trouble some of us who attempt to make accurate diagnoses in heart disease.

One of the difficulties which I most commonly encounter in the recognition of cardiac trouble and its congeners is what might be called the substitution symptoms, the pain substituting symptoms. Dr. Borg referred to precordial pain, yet we are certain that there are patients who have exactly the same fundamental pathologic changes that do not express pain as a sign of cardiac overstrain, but they have some substitution symptoms. Lipman has recently devoted a very large amount of time to this, and those of you familiar with cardiac pathology will recognize the importance of his name in connection with cardiac studies. He has recently given a large amount of time and has made a very interesting and valuable presentation of the value of these substitution symptoms, the most important of which are dizziness, fatigue. One would think that fatigue, for instance, would be the sign of the pathological and physiological condition. It is not so. It may be purely a subjective symptom, a substitute for precordial pain. Fatigue, dizziness and confusion are among those that may be recognized.

Again, the symptom which needs extraordinary care in interpretation is palpitation. Both of the essayists have brought out the fact that most palpitation is not expressed in a pathologic condition. Yet it is a pathologic condition if we exclude that symptomatic palpitation when we go to see the lady of our choice and some such physiologic responses; but palpitation in the sense of that which people complain of most often can be found to be an expression of the perfectly normal heart, an expression of a disorder or an over-excited nervous system which is just as much subject to control and to help on the part of the physician as it would be if it were a cardiac disorder. As people consult me

*Dr. Barron's paper appeared in the August and September numbers of Minnesota Medicine, Page 487 and Page 535 respectively.

for cardiac disease I find a larger proportion of them not suffering from any damage of the heart which I can discover, but most commonly from disorders of its mechanism, from extrinsic or nervous sources.

That determination is not easy. One has to do two things. One has, first, to determine that the heart is not pathologic, and in my experience that is one of the most difficult things to do. Dr. Borg and Dr. Barron have both referred to heart size. Many pathologic hearts are not enlarged, and I need only to recall to your minds the fact that in coronary disease, in angina pectoris, we have certain cases in which the heart is not enlarged, and in coronary thrombosis there is no enlargement, and in the latter case we may have a patient passing out from rupture of the heart because of the occlusion of a considerable area of softened muscle. We must be extraordinarily careful before we make a negative diagnosis of cardiac enlargement. Having made that, the difficulty arises in determining what is the underlying condition, we will say, in the nervous system. That is where we as physicians have the greatest difficulty, where I, not trained specifically in neurological and psychiatric fields, find my greatest difficulty. I wish I were better trained. I think I have some sense of values so far as personality is concerned, and yet I find it is often necessary to call in the aid of the neuropsychiatrist to dig out from the personality of that individual the underlying irritant.

There was only one other point that I wanted to bring out in these difficulties, and that is the point referred to by Dr. Barron, and the truth of that I think we must attest, that in the field of cardiac pathology many of us are inclined to call nephritis a condition which isn't originally nephritis at all. It may be either arterial degeneration and its consequences, or else the passive congestion of the kidney which gives albumin, casts, blood, and all the other so-called typical symptoms of nephritis, and we are inclined when we find these changes in the urine to think we are dealing with a case of nephritis. We must use extraordinary care to exclude cardiac decompensation, because so frequently a hasty examination will make us think we are dealing with a renal case when a careful examination over a considerable period of time and under good control will show us that the condition is cardiac and not renal.

I would say that the *x*-ray is of very great value in the determination of the size of the heart, which can be demonstrated to be enlarged. I have very great difficulty in a certain group of cases in saying whether enlargement exists or not . Dr. Barron didn't have time to outline the differences in the shadow of the heart accompanying differences in physical build. These factors bring considerable added difficulty, when we see certain changes and a gross enlargement in the *x*-ray that our fingers and other means of diagnosis do not give.

Dr. F. A. Willius (Rochester): Both these papers have been very contributory and very timely. The importance of the early recognition of heart disease cannot be too greatly stressed. Both authors have brought out very forcibly the increase in the incidence of heart disease in this country. It stands now as the greatest individual cause of death in this country, and that brings before us very forcibly our obligation and our responsibility as far as the prevention of heart disease is concerned.

You probably all are familiar that in 1922 the American Heart Association came into being, an organization that now has representative organizations in almost every state of the Union. Regrettably, Minnesota has been one of the last states to organize. The attempt is now being made. I think it is very necessary for all of us in the profession to give a good deal of thought and consideration to the question of prevention. I haven't time to discuss this thing fully, but there is one point I do wish to make that was already definitely suggested by Dr. Barron; that is, many of your vital statistics are inadequate owing to the fact that we have not had an adequate and comprehensive nomenclature or classification. We have all been talking a different language, and the advance in the future of a better understanding of heart disease is going to depend on more accurate diagnosis. I was very glad to hear the Doctor describe the usual diagnosis of chronic myocarditis, because that has been a cloak under which all forms of heart disease have been grouped, and it is a condition that in the strict sense of the term, and as he has shown and others have shown is a relatively rare disorder.

Dr. Barron's classification is very adequate. It is very much in text what the classification accepted by the American Heart Association is, and permits the diagnosis or the placing in this list of every known pathologic condition of the heart.

Dr. Barron didn't have much opportunity to go into the treatment of heart disease to any extent, especially the treatment of decompensation, and there is just one point there that I should like to mention. I believe since the introduction of quinidin by Frye in 1918, the greatest contribution to the treatment of heart disease has been the introduction of the mercurial diuretics, novasurol and salyrgan, especially their combination with ammonium nitrate and ammonium chlorid. The results in the combination of these drugs has been almost unbelievable. Since the quite general use of those therapeutic agents in this country the incidence and necessities for paracentesis has been reduced practically to a minimum. I think since 1924 we have performed no paracenteses.

PURPURA HEMORRHAGICA FOLLOWING NEO-ARSPHENAMINE*

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HEMORRHAGIC purpura following neo-arsphenamine is a rare condition; only two cases are reported in the American literature (Combes,[1] Morton Smith[2]). The occurrence of a case of this condition therefore seems to be of sufficient interest to warrant a brief report and discussion. The following case was a patient at the University Hospital under the care of Dr. H. L. Ulrich.

REPORT OF CASE

A. J., a railroad employee, aged 42, had twelve years ago a penile lesion which was diagnosed chancer and for which he was treated for about three months. Later he had been irregularly treated at different periods and he finally came to the University Hospital Dispensary on October 27, 1928, where he was found to be suffering from early cerebro-spinal lues. Until January 29, 1929, he had been given twenty injections of bismuth salicylate. From February 4th he was given neo-arsphenamine 0.4 grams once weekly, the last dose being given on March 11th. On March 2nd he had a nose bleed which was difficult to stop. Two days later another epistaxis occurred which required medical attention. He now also noticed hemorrhagic spots on his legs and that he bruised easily. From March 5th there was blood in the urine. For these symptoms he was admitted to the University Hospital on the evening of March 11, 1929. On admission he showed subcutaneous bruises all over his body, especially over the right eye. His nose was filled with clotted blood. The tongue was covered with hemorrhagic spots. The blood pressure was 115/62, the heart rate 68 and regular. Neurological examination confirmed the impression of early cerebro-spinal lues. Physical examination showed no other important findings.

The blood findings were:

Date	3/12	3/15	3/19	4/1	4/9	4/16	5/20
Hgbl.	60	62	38	40	50	59	58
Red Cells	2,590,000	2,800,000					
Platelets	50,000		130,000	272,000			240,000

White cells 3/12: 6,300, PMN's 70%, W.B.C. 25%, Eos. 5%.
Slight anisocytosis
Wassermann: positive

Spinal Fluid: Clear, pressure 150, Wassermann positive.
Colloidal gold curve 5555541100

Treatment other than transfusion:
Hemostatic serum was given in 5 c.c. and 2.5 c.c. doses intravenously with no effect, and morphine gr. 1/6 when he was excited. He also received a course of ultraviolet light, beginning march 14.

Laboratory Tests: The urine contained gross blood until March 16th, from then on it rapidly became clear and continued so during the remainder of his stay in hospital.

The condition remained unaltered for the next few days with constant nosebleed. On the 15th he had large emeses of clotted blood. It was not certain whether this was previously swallowed or due to gastric bleeding. He became violent and restraint was necessary. He was then given a transfusion of 750 c.c. of blood after which his temperature increased to 101; for the next few days it was irregular, gradually coming back to normal on the 22nd. From March 19th no more bleeding occurred and his ecchymoses gradually disappeared. He made an uninterrupted recovery and was discharged from the hospital April 20, 1929. Since then there have been no more hemorrhages.

DISCUSSION

Frank[3] classes purpura hemorrhagica and aplastic anemia together as varying degrees of depression of the hematopoietic function of the bone marrow. In purpura there is an exclusive decrease of blood platelets and in aplastic anemia the entire hematopoietic myeloid system fails. Anatomic damage to the peripheral vessels has not been proven in purpura. Possibly, therefore, the few cases which have been reported of aplastic anemia following the administration of drugs of the salvarsan group are of the same essential nature as the case reported by us. Only Moore and Keidel[4] in this country have reported aplastic anemia after neoarsphenamine. Combe's case was probably not one of simple purpura for the white cells were diminished out of proportion to the general anemia and there was a complete failure of the granulocytic system to regenerate. It seems more appropriate to class Combe's case as one of agranulocytosis, because the platelets were well above the critical level and the changes in the red cells can be explained as being secondary to the hemorrhages. This

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is of special interest for our purpose, for Piney[5] suggests that agranulocytosis may be another example of selective toxic effect on the bone marrow. In the study of the reported cases of "hemorrhagic diathesis" after drugs of the salvarsan group the cases with multiple hematopoietic disturbances imperceptibly blend with those of true hemorrhagic purpura; that is, cases where the change is exclusively thrombo-cytopenia. Thus intoxication with this group of drugs furnishes a good example of the common etiology of a large group of hemorrhagic disorders.

Practically all patients with hemorrhagic disorders after neo-arsphenamine are syphilitics and a luetic effect on the hematopoietic system might be considered a factor predisposing to the disorder. Syphilis may cause a simple secondary anemia and has been strongly suspected of being an etiological factor in some cases of pernicious anemia, but we have been unable to find any evidence in the literature that the luetic toxin causes depression of any strictly hematopoietic function.

Neo-arsphenamine therefore seems to be the sole exciting etiological factor. In this drug there are two toxic elements, the arsenic and the benzol ring. From Moore and Keidel's discussion[4] it is evident that they believe they are dealing with arsenic poisoning, but neither Naegeli's nor Schittenhelm's handbooks contain reference to any myelotoxic effect of arsenic. It is generally conceived that the effect of arsenic on the circulatory system is on the capillaries, especially of the gastro-intestinal tract. Such effect does not conform to the myeloid damage found in the reported cases of neo-arsphenamine poisoning.

The picture is much more that of benzol poisoning. Thus it is well known that benzol may affect myeloid hematopoiesis, and Piney[5] states that under certain circumstances this effect may be limited to the thrombocytopoiesis; he quotes Duke's experiments with benzol poisoning where the platelets practically disappeared from the blood, while the leukocytes and red cells were not altered in numbers. The clinical manifestations of this myeloid damage by benzol closely resemble the hemorrhagic diathesis produced by neo-arsphenamine. Thus Frank,[3] in Schittenhelm's handbook, reports a case of benzol poisoning, which fits perfectly into the series of hemorrhagic diatheses after neo-arsphenamine.

As far as our evidence goes we may then conclude that development of a hemorrhagic diathesis after neo-arsphenamine is due to the toxic effect of benzol on the myeloid hematopoietic system and that syphilis or arsenic are not proven to play any part in this condition.

Reference to other cases may be found in Combe's paper and in Hirschfield's article in Schittenhelm's handbook[6]. Two additional cases have recently been published by Maderna[7] and by Louste, Ducourtioux and Lotte[8].

REFERENCES

1. Combes: Arch. Dermat. and Syph. 15:194, 1927.
2. Morton Smith: Arch. Dermat. and Syph. 11:237, 1925.
3. Frank: Schittenhelm's Handbuch der Krankheiten des Blutes und der Blutbildenden Organe, Vol. II, Julius Springer. Berlin, 1925.
4. Moore and Keidel: Arch. Dermat. and Syph. 4:169, 1921.
5. Piney: Recent advances in hematology: Churchill, London, 1927.
6. Hirschfeld: Schittenhelm's Handbuch der Krankheiten des Blutes und der Blutbildenden Organe. Vol. I. Julius Springer. Berlin, 1925.
7. Maderna: La Riform Medica, 43:704, 1927.
8. Louste, Ducourtioux and Lotte: Bull. Soc. Franc. de dermat. et Syph. 33:636, 1926.

SENSE OF HEARING SURVEY OF SCHOOL CHILDREN IN FERGUS FALLS

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WHEN given an opportunity to present a paper before this great society my first feeling was that one of such poor attainments is not justified in occupying time which could be used so profitably by distinguished members, who, in research and practice, have added so much to our knowledge, who each year in solving mysteries are making plain the road on which we of the rank and file may safely travel. Who of us are not filled with pride and humility that there is no society in the world today contributing so much to medical knowledge as the Minnesota State Medical Association, and besides this there is none doing more towards solving the problems of the relations of the physician to the public.

In view of these facts the importance of the subject alone justifies my appearance. The tragedy of poor hearing is sufficient reason for its consideration anywhere and any time there is material to contribute.

Dr. Wendell C. Phillips (past president of the American Medical Association) has said, "Every handicap in human experience has its psychological bearing, every calamity its woes, but none except obvious fatal diseases provokes more despair, hopelessness and depression than defective hearing."

The tragedy of lost vision, after the first shock has been eased by time, leaves the victim cheerful and full of hope, but when hearing is gone, hope and cheer depart forever.

I am glad, therefore, to follow the lead of the men who are unselfishly giving of their valuable time and talents advancing the idea that the cure of deafness is in prevention and that the practical road to prevention is the regular systematic examination of hearing in school children.

On account of the widespread impression that nothing can be done for the prevention and cure of defective hearing, from the time the baby's acute otitis media is called indigestion, colic, flu, or worms, to the time he secures an artificial drum or ear trumpet through the local drug store, the care of his priceless ears has usually been neglected.

Pediatricians have rendered a great service in calling attention to the frequency of silent ear infections as a cause of fever and debility of obscure origin, and the importance of early recognition to avoid permanent injury to the body structures, including the ears. The over-anxious may occasionally needlessly puncture a drum or enter an innocent sinus but the serious mistakes are on the side of omission.

Drs. Patton and Duprey of New Orleans, in a recent article on "Deafness and Its Prevention" make a plea for a more frequent performance of tympanotomy, emphasizing the fact that it is the large group of cases in which there is a subsidence of symptoms but with fluid remaining in the cavity that most often results in permanent injury.

There is a general impression that in draining the middle ear the conducting apparatus only is saved. Frances P. Emerson of Boston says, "After many years of observation I believe that the etiology as outlined is applicable to every type of chronic progressive deafness and there is no way of differentiating between so-called perception and conduction deafness as the perception apparatus is involved from the first in all cases."

It is not only infections that involve the middle ear that may cause damage. James Leyda in writing on deafness in children says, "It is a common clinical experience to have a patient with active sinusitis complain of fullness in the ears with diminished hearing and also common to have it disappear after treatment."

Until the development of the audiometer, the examination of a large group of individuals required so much time and was complicated by so many conflicting results that it was not undertaken. The examination of two or three hundred was about the limit. Now in Minneapolis alone 30,000 children are annually examined.

The audiometer was designed by the Bell Telephone Laboratories, Inc., for the Western Elec-

tric to give their engineers an accurate, practical method of determining the capacity and requirements of the human ear. The machines designed not only met their needs but have rendered otology an immense service. The 4-A audiometer, by the use of ear phones, makes it possible to test forty people at once, or at the rate of more than one hundred per hour. The findings, however, must be carefully interpreted.

Some, who on the first test show defects, may not have either temporary or permanent loss of hearing. These errors may be due to improper adjusting of the ear phones, extraneous noises, diverting influences or the inability to write to dictation. Therefore those who fall below a predetermined standard are retested, once or twice in groups, and finally individually.

On the other hand those found normal are for the time being eliminated because it is impossible for one with faulty hearing to write a perfect paper.

Dr. Horace Newhart was one of the first to secure from the Bell Telephone Laboratories a 4-A audiometer in the developmental stage and apply it systematically to the testing of the hearing in school children. As a result of his work, Minneapolis was the first city in the world to officially institute the regular testing of school children's hearing by means of the audiometer. Since this initial venture more than two years ago over fifty cities have fallen in line and others are coming in rapidly.

Dr. Newhart has said, "The possibility of accurately and rapidly examining simultaneously forty pupils with the Western Electric 4-A audiometer marks a new era in otology. The regular examination with this instrument is the initial step in an effective practical effort to conserve the hearing and it is the duty of all public schools to institute it."

It was through Dr. Newhart's help that we secured a 4-A audiometer for use in making the survey of school children in Fergus Falls. Dr. Newhart came to Fergus Falls bringing two assistants and devoted a day and two nights instituting the work which we carried through. It gives me great pleasure also to acknowledge the wonderful coöperation given by Supt. Lippett, the School Board, the teaching staff, all the doctors and particularly Miss Lunde, our school nurse, who was tireless in her service, devoting many hours of many days arranging groups, correcting papers and tabulating results. Though the 4-A audiometer makes it possible to make ear tests forty times more rapidly than other means, still, when the entire school population down to the second grade is to be examined, many pupils two, three and even four times, a great deal of work must be done and the routine of the schools considerably disturbed. The group plan is not practical below the third grade, as these children are unable to write to dictation.

Total number of pupils tested	1,525
Those having a loss of hearing in excess of six sensation units in one or both ears, two or more tests, were	113
Those having a loss of hearing in excess of six sensation units in one or both ears, on one test only, were	25
Total	138

These 138 were tested individually with the 3-A audiometer and 23 eliminated as not having sufficient loss of hearing to warrant further examination. One hundred fifteen is a little less than 8 per cent of the total examinations, giving about the same per cent of defectives as found in Minneapolis and other cities.

On the whole the findings of the two audiometers corresponded well. One must always bear in mind that it is possible for a child's hearing to vary considerably on different occasions, especially if there be pathology present causing at times congestion with closing of the eustachian tube. The following notice was mailed to the parents of 115 with defective hearing:

Dear Parent:

It was found when the ear tests were made in school that ..... has a defect in hearing.

Realizing that poor hearing is one of the greatest handicaps one can have, and that many, if cared for in youth, can be relieved, Fergus Falls schools are taking the lead among the smaller cities in these examinations.

All the doctors in town who do this special work are coöperating with us and have agreed, during the next ten days or up to May 4, to examine, free, for the defect, and determine whether it can be remedied. The tests at school were not given under ideal conditions, and we are anxious to have these examinations made.

Will you not assist in this work by promptly sending ..... to one of the doctors doing ear work for further examination.

Kindly take this notice to the doctor, have it signed by him and return it to the school.

.....

Doctor's diagnosis.

I wish again to acknowledge the coöperation of the doctors in making these examinations, particularly Drs. Paulson, Combacker, Freeborn, and Kittelson.

Only forty or a little over a third of those given the notice have thus far gone to a doctor's office for further examination. This would seem to indicate that the public requires considerable educating.

The findings in the forty are as follows:

14, or 35 per cent, require removal of tonsils and adenoids.

7, or 17 per cent, require further observation.

3, or 7.5 per cent, the external auditory canals were obstructed by wax.

4, or 10 per cent, the poor hearing is due to internal ear defect. No suggestions given as to remedy.

1, or 17 per cent, have had in the past or still have a running ear.

8, or 20 per cent, no pathology discovered. With the office tests, ears are normal or nearly so.

CONCLUSIONS

1. Our findings indicate that over a third of the children with poor hearing have disease processes present, the removal of which should wholly or partially remedy the defect, while others have permanent injury which could have been prevented.

2. The audiometer is a rapid, accurate and convenient instrument for determining hearing acuity.

3. About 8 per cent of the school children in Minnesota above the second grade have defects in hearing greater than six sensation units. This conclusion is based upon surveys in Minneapolis, Fergus Falls and two other points where partial surveys have been made.

4. Defective hearing is one of the greatest calamities of life. Hope lies in the detection in early life of beginning defects and prompt institution of proper remedial measures. These remedies are not limited to the removal of tonsils and adenoids.

5. The resolution first adopted by the section on Laryngology, Otology, and Rhinology of the American Medical Association and later by the House of Delegates and many other important organizations is very timely.

"Recognizing the fact that the most effective means for the prevention of deafness consists in the early detection of hearing impairment, thereby giving opportunity for prompt removal of contributing causes, and believing it to be one of the important functions of our public school authorities to safeguard the integrity of the special sense organs as well as the general health of the school child, be it Resolved:

"That we heartily favor the provision by our public school authorities for regular periodic examinations of the hearing acuity of all public school children, such examinations to be adequate to detect even slight degrees of hearing loss."

DISCUSSION

Dr. Horace Newhart (Minneapolis): I wish to emphasize one or two points which Dr. Burnap did not have time to bring out in his admirable paper. He is to be congratulated on being the pioneer in his own community to initiate a service which is being urgently demanded in many parts of the country not only by the hard of hearing themselves, who want others to be saved from their handicap, but most recently by members of parent-teacher associations, by social workers and others wherever the possibilities of preventing deafness by the early detection of heretofore overlooked hearing loss has become known. The subject is still so new that few people even among the medical profession have more than a very superficial knowledge of its importance.

The two points I wish to make are these: First, the actual work involved in the prevention of deafness lies in the field of preventive medicine and as such should be handled by medical men and not be allowed to fall into the hands of other people who are less worthy to carry it on. The obvious suggestion is that we in our home communities take the initiative in introducing the periodic examination of the hearing of our school children.

Eighty communities, chiefly our larger cities, have already introduced the system of periodic hearing tests. The work is more needed, however, in rural districts and smaller cities, where we have not made the advance in school hygiene that we have among our urban school population. Within a very few years the question of adopting it will come up for consideration and be generally demanded. I believe it is the duty, in fact the privilege, of the medical men everywhere to foster and encourage this particular work.

Replying to the question of expense I would say that in larger cities the cost is nominal and it is more than compensated by the saving effected in reducing the number of repeaters, many of whom are retarded as the result of overlooked hearing loss. In the country or in smaller towns several communities can advantageously join in the purchase of the needed equipment, reducing the cost to the minimum. In a community the size of Minneapolis the needed instruments cost eight hundred to a thousand dollars. The smaller outfit for individual testing, one of which is employed by the University of Minnesota, costs two hundred and eighty dollars.

TREATMENT OF ACUTE OTITIS MEDIA IN INFANTS AND CHILDREN*

C. Walter Rumpf, M.D.
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CONFRONTED daily with fretful, feverish little children, I ask first to look at their ears. Therefore, I make no apologies for a subject which may seem commonplace, because in a majority of instances these little ones are suffering from acute upper respiratory tract infections, complicated by otitis media; and, for one, I have acquired a profound respect for the inevitability in some degree of this secquence. As general practitioners, the most frequent and important single condition with which we have to deal is acute upper respiratory infection in infants and children and otitis media the most frequent and important complication of this infection. You may object that this field belongs properly to the specialist, but in practice he sees few of these acute ears. These little patients must be cared for in their homes, their sufferings promptly relieved, and their general disease treated. The early recognition and adequate treatment, therefore, of acute otitis media in infancy and childhood is in the hands of the general man, and to him I address my plea.

The experience forming the basis for this short discussion is taken from over two hundred cases of acute otitis media in infants and children, ranging in age from two days to twelve years. Paracentesis of one or both drums was performed and treatment supervised. I have considered only the acute middle ear infections because the complications, the chronic ears, the defeats pass on to the otologist with the same deference with which the obstetrical calamities pass on to the gynecologist.

We may divide acute middle ear diseases into three groups: catarrhal, serous and purulent. These may, and do, run without sharp demarcation from the one to the other, in all grades of severity; and when it comes to treatment, it is not only a mistake but an impossibility to stand upon distinctions too sharply. In the catarrhal form there is a depression of hearing with a sense of fullness. Upon examination the drum head is retracted, the light reflex gone and a transudate of serum may be visible. There is little pain. Either the inflammation clears up with relief of the naso-pharyngitis or it goes on to the second stage of acute serous otitis media. Here we have actual bacterial invasion of the tympanic mucous membrane with swelling, reddening and formation of serous exudate which fills the cavity. Pain and general symptoms are acute. The drum head becomes hyperemic, the light reflex disappears, landmarks are obliterated. Hyperemia changes to dulness. Vesicles appear on the drum head or in the canal, especially in the influenzal infection. And lastly, we have the third group, purulent or suppurative otitis media, seen so frequently in the exanthemata, although often the terminal stage in the otitis media of respiratory infections. Here the mucous membrane becomes deeply infiltrated, perhaps ulcerative, involving all the middle ear structures. The contents vary from muco-purulent to purulent. The drum presents all the characteristics of the previous type but with more formidable severity. Hyperemia has given way to a dull gray, angry, pulsating drum head covered often with exudate. Pain and general symptoms are intensely acute and unrelieved by ordinary measures.

In what way, then, does otitis media in infancy and childhood differ from that in adults, and form a separate entity in diagnosis and treatment? In the first place, the peculiar anatomy of the eustachian tube in childhood invites infection. The tube is a short, almost straight, with poorly developed musculature, and the pharyngeal lumen widely patent at the level of the hard palate. This favors the entrance of infectious material by coughing, vomiting and by the inability of the child to keep its naso-pharynx free from secretion. Embryologically an interesting point might also be mentioned; namely, that one must bear in mind the analogy between the embryonal development of the eustachian tube and the upper respiratory tract as a whole. Here we find selective bacterial attacks on similar tissues, especially tissues undergoing rapid development, with the result that the infections are more severe and the coincidence of the two

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infections the rule rather than the exception. The external auditory canal is very short and small and is, in the newborn, in reality only a cleft. A true cartilaginous portion develops with increasing age. This makes examination tedious and difficult and calls for infinite skill and patience in cleansing these canals of debris preparatory to examination. After fussing for many minutes with a roaring prodigy I can understand how an acute ear is often overlooked from sheer exhaustion. Even the manipulation itself may cause a temporary congestion of the drum, but it is of utmost importance to see the drum in its entirety in order to evaluate the degree of inflammation in the child's middle ear.

The drum itself has characteristics which distinguish it from the adult condition. The angle is more acute the younger the subject, the process less prominent. The cone of light is variable and scarcely visible in young infants. The drum is dull gray, with little sheen on the surface as in the adult. The membrane is thicker, tougher and less transparent, so that a fluid level is almost always missed. The practical importance of these physical factors operating to make inflammatory processes of more serious import in childhood cannot be stressed too strongly. By reason of them, bulging of the drum is much less marked than in the adults and excessive mucous membrane swelling often resembles bulging. There is a partial relief of pressure by discharge of fluid through the short eustachian tube into the throat, contributing to the deceptive appearance of the bulging drum. Spontaneous perforation is therefore more infrequent in children than one realizes and a smouldering focus remains, if this fact is not appreciated. Only too significantly is this brought out by the postmortem findings by many observers of purulent otitis media in a majority of infants and young children dying from all causes. Frequently it was undiagnosed during life. One series showed gross purulent infection in 80 per cent, and in half of these the drums were intact.

The symptoms of the otitis media in infants and young children are so unreliable as to be of very little diagnostic help to us. They comprise any or all of the symptoms of acute infection. There may be gastro-intestinal disturbance, vomiting, refusal of food. Irritability, sleeplessness, crying, especially when nursing or eating, or usually prominent. In fact, a restless, crying infant, unrelieved by ordinary means, must be shown not to have otitis media. Fever is usually present and may be very high, with resulting nervous manifestations up to convulsions. Subnormal temperature is not uncommon and often defeats diagnosis. I would go so far as to say that unexplained fever in infancy is a presumptive otitis media until proven otherwise. Pain is necessarily a variable symptom and localization impossible in these little patients. A child may pull at its ear, but usually the wrong one. They will often lie on the affected side or find comfort when held against the mother on that side. Grandmother will always venture the opinion that it is teeth, but it is disconcerting to find how many ectopic teeth are found by careful otoscopic examination. More tragedies are committed in the name of teeth and most premature dentitions are relieved by paracentesis of the tympanic membrane involved. In other words, you cannot rely on symptoms when a child's ears are in question. The physical appearance of that drum at the convergent end of an electrically lighted otoscope is our only justifiable criterion. There are no laboratory aids.

Peculiar to infants, I wish to stress also a type known as otitis media neonatorum. You will recall that at birth the tympanum is filled with a gelatinous substance together with myxomatous tissue. Added to this is frequently a mixture of prenatal fluids, meconium, etc. Occasionally infection supervenes and we are presented with a crying, restless newborn, often with high fever and markedly dehydrated. Do not neglect the ear drums in these cases. Prompt relief follows paracentesis. I have encountered four in this group studied, and two had been diagnosed simply dehydration fever.

Our diagnosis, therefore, of acute middle ear infection thus established we must outline a rational approach to treatment. There is still a strong popular prejudice against paracentesis of the ear drum. Education of the mothers to combat the fallacy that opening of the drum will cause impaired hearing should be the mission of all of us. In our prophylaxis of deafness campaign we should stress this bit of truth: that early careful paracentesis is our most logical weapon in prompt and sure prevention of abnormal hearing after infection of the middle ear. And further, of equal and compelling importance to be stressed is the speedy relief from intense

suffering which paracentesis affords. I have had this brought home on more than one occasion when these little patients who have had previous experience with ear infection have asked their mothers wistfully to please call the doctor so that he might open the ear and get relief from the agonizing pain.

In our treatment, remember that numerous physical factors combine to make examination difficult, and evaluation of the degree of inflammation unreliable. Familiarity with the peculiarities of the disease in infancy and childhood is the necessary supplement to your experience. If seen early, I give the case a trial of five per cent phenol and ichthyol in glycerine, administer a salicylate, apply radiant heat, and watch the ears daily. If the inflammatory reaction and symptoms do not promptly subside, I perform paracentesis of the drum. To wait for spontaneous perforation of the ear drum is to invite disaster. I have seen physicians stand by reassuringly waiting for the drum to break as if it were a bag of water, while the poor little patient suffers agony. As Trible says, "Delay is in opposition to the oldest sound surgical law which demands that confirmed pus shall be evacuated." It is far better to err on the side of safety and open a few beginning serous ears than to delay until pus has formed and done its damage. When we are greeted by pus in the canal we have come too late; the entire mucous membrane has been broken down and infection has permeated the entire middle ear structure. Spontaneous perforation is seldom sufficient to give adequate drainage and incision properly performed is practically without risk and has everything in its favor.

The question of paracentesis is not always easy to decide, but when in doubt, open. The most dangerous case is often the most puzzling and this simple procedure will confirm your suspicion. I can find no argument designed to show the dangers of paracentesis which outweighs the danger of unrelieved purulency. I always open a frankly bulging drum. I always open a pulsating drum, a drum covered with exudate, a drum bulging in the superior portion especially, a drum with multiple bulging areas, a drum with increasing or stationary clinical symptoms, no matter how innocent it looks. It is far better, in my experience, to incise the drum in the serous stage before it has undergone frank purulency. The symptoms are relieved, recovery is more rapid, the period of discharge shorter, and return of hearing promptly follows.

I reserve one exception in my uncompromising attitude toward a bulging drum-head and that is in the deeply injected, angry looking drum with slight bulging, in a fulminating general infection where the ear seems not the worst offender. Better a more somber finish to these drums before attempting paracentesis. You will set up a severe reaction, and there will be no relief from pain. Rather withdraw in good order for observation until nature has taken control of the situation. Don't misunderstood me, that all acute ears come to paracentesis. Many subside very kindly and you can tell by one or not more than two days of observation which will fall into this group. Pain subsides, but at the same time the hearing improves rather than remains impaired as in the bulging stationary imperforated drum. The landmarks reappear and bulging becomes less marked. I would emphasize the rapidity of this. But relief of pain symptoms alone is not a contra-indication to paracentesis, because only too frequently the tough drum has distended its limit and rupture does not take place. Pain leaves at this point and gives a sense of false security to the observer. Many errors arise from this apparent relief and the mother will object that the child has no pain and therefore is well, but the only safe guide is the stationary appearance of the drum head; and paracentesis, the urgent procedure.

A useful confirmatory method which I employ especially in infants is to touch the drum gently with my paracentesis knife to test its tympany. The drum without exudate gives a characteristic tense egg shell resistance as distinguished from the tough boggy resistance of the saturated drum head. And, to repeat, I cannot urge too strongly the value of paracentesis of an acute middle ear in an infant or a little child; paracentesis while in the relatively benign serous or prepurulent stage. The rapid uncomplicated recoveries have been in these cases; the harrowing postponed recoveries in those where delay and indecision "bring knowledge for which the use has passed."

To return, there is a syndrome of infection in infancy where simple paracentesis will not suffice, and the splendid work of Marriott has given us a method whereby these cases, if done early, may be saved. Since Hartman in 1894, this symptom-complex has been described of infants

suffering from severe gastro-intestinal disturbance and malnutrition associated with otitis media. Marriott found at autopsy that the mastoid antra in these infants contained virulent pus. And to quote him relative to this type of case he concludes that "in some instances recovery follows simple paracentesis, but in others, symptoms persist. It is in these cases that the infection has involved the mastoid antrum and has led to a swelling of the mucosa so that drainage of the middle ear fails to drain the antrum. When this occurs, the otologic evidence is a swelling or sag of the posterior superior canal wall, just external to the tympanic membrane. In most instances there is neither redness, swelling nor tenderness over the mastoid. Occasionally an opening made through the sag in the canal wall brings about sufficient drainage, but in the majority of instances it is necessary to resort to post-auricular drainage or antrotomy. This simple operation, performed under local anesthesia, establishes adequate drainage, and is in the majority of instances followed by extraordinary improvement in the general nutritional condition of these infants."

Having decided, therefore, upon paracentesis I have the child firmly held and swathed. No general anesthetic is given under three years of age and I am giving increasingly less over that age, because pain is only instantaneous. Bonains solution, consisting of equal parts of phenol, menthol and cocain, instilled into the canal, is helpful as a local anesthetic both to mother and child. I work from the head end of the child; that is, observe and operate upon the drum upside down. This approach permits you to restrain the head and affords greater safety in making the incision in the drum. Sterility in performing paracentesis is highly essential. I cleanse the ear canal with alcohol or hexylresorcinol and the speculum of the otoscope as well, because invariably with the infant-size speculum the knife will strike its sides. A curved incision in the posterior, inferior quadrant of the drum affords the best drainage. Keep in mind that the younger the infant the more acute is the angle of the drum and paracentesis more difficult. Sweeping the knife upward from your reverse position, the completion of the incision will be away from the drum, and when the inevitable lurch of the child's head takes place, the knife will be free in the canal and not in the vicinity of the ossicles where injury may result. Take care, however, not to strike the canal, setting up a diffuse external otitis. Guard also against an incision which penetrates too deeply, injuring the sinus or the bulb below. Paracentesis of the infant drum calls for a delicate bit of minor surgical skill.

I have found that even large openings in the infant's drum tend to close before drainage is complete, and repeated incision is frequently necessary. Partial relief of pressure through the nasopharynx operates to cause this annoying complication. Do not hesitate to reopen these drums until clinical symptoms have subsided and the drum head appears normal. The possible formation of scar tissue on the drum, with resulting impairment of hearing from repeated incision, is negligible in infancy. Pulsation of the released fluid is almost the rule. Relief of pain is usually instantaneous although before each evacuation of accumulated secretion the child may complain of pain and cry. The fever generally falls without delay, although I have seen it persist for days where no complication could be determined or other focus demonstrated. Lillie calls our attention to the cases where septic temperature continues after paracentesis and urges the search for foci such as pyelitis and central pneumonia, and not necessarily for the dangerous local extensions of the otitis media.

As to the after-treatment, cleanliness is the first and last essential. Wipe out the ears frequently with dry sterile cotton on applicators. A gauze wick may be carefully inserted in the older patients. Instruct the mothers to wipe out the ears carefully and thoroughly. There is practically no danger of their going too deep because of their innate fear of doing so. I do not irrigate a discharging ear with any solution. I am confident that it increases the purulency of the discharge and inhibits healing of the drum.

The most effective auxiliary treatment has been the use of radiant heat. Gerstenberger has reported a series of gratifying results using the method described by Oeken of radiant heat from a high powered nitrogen bulb. Oeken originally employed this method in aborting the catarrhal ear to avoid paracentesis. I have used this in numerous cases with good results. More particularly is it useful in discharging ears. As is generally known, radiant heat relieves pain more effectively than any other agent. It brings about a local hyperemia, is bactericidal, and very pene-

trating. The discharge fairly pours out under the heat, the child relaxes and goes to sleep. The lamps which I employ are the Thermolite with a three hundred and sixty watt nitrogen bulb and the carbon arc or zoalite. They are left on for thirty minutes twice a day, or more frequently if desirable. In older children I employ, in addition, the quartz light with ear applicator with more rapid results. In debilitated infants, general radiation with the quartz light builds up their resistance very effectively with a shortening of the draining period. I cannot be too emphatic about the value of radiant heat in relieving pain in otitis media and rapidly clearing up a discharging ear.

Work has been done recently with specific antiseptics introduced into the ear. Smith of Boston has made an extensive study with the following results. He has found that sodium-hydroxymercuribenzophenonesulphonate in one half per cent solution washed back and forth in the ear destroys gram-negative bacteria (*Bacillus coli*); and that gentian violet is bactericidal for gram-positive organisms (staphylococcus, diphtheria and pneumococcus). Further, that 2 per cent acetic acid destroys pyocyaneus, and neutral acriflavine is most effective in streptococcus infection, but least satisfactory. He concludes that by utilizing the selective bactericidal properties of these solutions and alternating them, he can clear up his cases in an average of two weeks sooner than by the older methods. I have employed these solutions and recently, in addition, hexylresorcinol solution, in the discharges which did not rapidly clear up and I find them effective in many instances. This treatment is difficult to supervise in the home except with intelligent coöperation.

It is essential in treatment not to neglect the child as a whole. Insist on keeping these little ones in bed during the early days of the discharge and your recovery will be more rapid. I treat the upper respiratory tract infection by instilling into the nose a solution of 10 per cent neosilvol either alone or combined with 2 per cent ephedrine. This is highly important when one appreciates that paranasal sinus disease almost invariably accompanies acute otitis media in infants and children (Lierle), and persistence of discharge is often dependent on this association. Clear up the upper respiratory infection and the middle ear complication will be shortlived under proper treatment. Adenoid infection must be watched carefully and surgical interference advised in discharges which do not respond to local therapy. And finally, it is a part of duty to these children to test their hearing for several weeks after acute middle ear invasion, in order to detect early a possible residual catarrhal deafness.

Results: In over two hundred cases of acute purulent otitis media treated, the average duration of discharge was sixteen days. Three patients developed acute mastoiditis, were operated upon, and recovered. No chronic discharging ears resulted in this series and there were no other complications. Three patients with ears discharging over six weeks had undoubted mastoid involvement but in the absence of external signs were not operated upon and recovered without damage to their hearing.

SUMMARY

Two hundred cases of acute purulent otitis media in infants and children, in which paracentesis of one or both ears was performed, were studied with special reference to the results of treatment.

Otitis media is the most frequent and important complication of acute upper respiratory tract infections in infancy and childhood and has distinct characteristics which make it an entity apart from the same disease in adults.

Otitis media is the most frequent and urgent cause of fever, fretfulness and certain gastro-intestinal disturbances in infancy and childhood and should be diagnosed early and accurately.

Otitis media neonatorum is a frequent cause of fever and crying in the first few days of life.

Prompt paracentesis in the serous stage is sound surgically, gives early relief of symptoms, and best promise for rapid and uncomplicated recovery.

Radiant heat is the most effective physical agent in treatment.

Cleanliness and dry wiping is an advance over irrigation of discharging ears.

Specific dye therapy offers promise of more rapid clearing up of infection.

Otitis media is a manifestation of a general infection which must be alleviated primarily.

Prophylaxis of deafness must begin with in-

telligent treatment of the source—acute middle ear suppuration.

REFERENCES

Abts: Pediatrics. W. B. Saunders Co., 8:267.

Babcock, E. S.: Otitis media in infants. Arch. Ped., 1927, 44:508.

Clinical Pediatrics. D. Appleton & Co., 9:38.

Dean, L. W.: Otitis media in infants. Arch. Otol., Rhinol. and Laryngol., 1927, 6:201.

Drury, D. W.: Infantile otitis media. Bos. Med. and Surg. Jour., 1926, 194:96.

Gallaway, L. M.: Otitis media in infancy. Jour. Kan. City Med. Soc., 1927, 27:335.

Gerstenberger, H. J.: Use of radiant heat in treatment of otitis media. Am. Jour. Dis. of Child., 1922, 24:320.

Goldsmith, P. G.: Infections of middle ear tract. Proc. Interstate Post-grad. Med Assn., 1926.

Kopetzky, S. J.: Otologic Surgery. Paul Hoeber, 1925, 1:92.

Lierle, D. M.: Otitis media in infants. Ann. Otol., Rhinol. and Laryngol., 1927, 36:604.

Lillie, Harold: Ann. Otol., Rhinol. and Laryngol., 1922, 20.

Marriott, McKim: Pediatric aspects of Otolaryngology. Ann. Otol., Rhinol. and Laryngol., 1927, 36:686.

Oeken, W.: Quoted from Gerstenberger, ibid.

Smith, D. T.: Causes and treatment of otitis media. Am. Jour. Dis. Child., 1924, 28:1-15.

Trible, G. B.: Surgical treatment of otitis media in children. U. S. Naval Med. Bul., 1925, 23:362.

WHERE DO PEOPLE DIE?

Workers in the field of public health and particularly those concerned with the broad aspects of the hospital problem, will be interested in an article by Dr. J. V. DePorte, Director of the Division of Vital Statistics, entitled "Where do People Die—at Home or in Hospitals?" published in the August, 1929, issue of *The Modern Hospital.*

A survey of the more prevalent forms of sickness in certain districts of rural New York which was recently carried out by the State Department of Health, indicated that each year there occur in the country as a whole more than 125,000,000 cases of illness, with a quarter of a billion as not an impossible estimate. The mortality in the entire country in 1927, based on the number recorded in the registration area, was approximately 1,360,000. This gives an average of from 100 to 200 cases of sickness for each death. The growing recognition of this fact by organized public opinion manifests itself in diverse ways, among which the development and increase of hospital facilities are outstanding. According to the latest figures, in the course of the twenty-year period, 1909-1928, the number of beds in hospitals of various types in this country more than doubled—from 421,065 to 892,934—while in the same interval the population increased by 30 per cent.

The necessary information on the prevalence of sickness in sufficiently large areas not being available, the New York State Department of Health approached the analysis of the hospital situation from the less satisfactory but more practicable angle of recorded mortality.

Comprehensive tables, based on the returns for 1926, show that out of the 75,268 deaths in the State, exclusive of New York City, 52,885 occurred in private dwellings and 22,383 in state and private institutions. Of 1,000 institutional deaths, 642 were recorded in general, special and surgical hospitals, 149 in state institutions for insane, 76 in county and city homes and almshouses and 59 in tuberculosis hospitals and sanatoria.

The percentage of deaths recorded in institutions was greatest from puerperal diseases and least from diseases of the circulatory system. In the group of general hospitals, 52 per cent of deaths were of persons over forty-five years of age and 15 per cent over seventy, while in tuberculosis hospitals and sanatoria, three-quarters of all deaths were of persons under forty-five years of age.

An analysis of the mortality in the State, exclusive of New York City, according to the general nativity of the decedent shows that the proportion of foreign-born persons who died in institutions—33.1 per cent—was higher than the corresponding proportion of native-born—28.5 per cent. In general hospitals the percentages for these two groups of the population were identical, 19.0 per cent. The proportion of foreign-born was higher in institutions for the feeble-minded and the insane, being 6.3 per cent as against 3.8 per cent native-born; in county and city homes, the foreign-born registered 2.8 per cent and native-born 2.0 per cent; in tuberculosis hospitals and sanatoria foreign-born 2.2 per cent and native-born 1.6 per cent. In maternity hospitals and infant homes, however, it was found that deaths of native-born represented 95.5 per cent of the total. In this connection we may say that the unlike age composition of these two groups of the general population in all probability accounts for most if not all of the differences shown above.

The results of this study, it is hoped, will give some measure of the extent to which hospital facilities meet the needs of the people.—*Health News,* Sept. 30, 1929.

THE GENERAL HOSPITAL AND TUBERCULOSIS*

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A DISEASE such as tuberculosis that we know so much about should be controllable. The profession says it is controllable, but as a matter of fact we are not controlling it. This is said with a full knowledge of the statistics from which descending graphic waves are manufactured. These are based on the death rate. What we want to see is a decline in the incidence of the disease. That medical science is able to coax and coddle the victims of tuberculosis into a few more years of existence is encouraging but it is hardly an end in itself. The history of the struggle against tuberculosis is within the memory of most of us. It has been a brave and gallant fight, but it must be accounted still a drawn battle.

In all medical reforms the doctor has three great forces to contend with: doubt in his own methods that are not yet proved; the static condition of the mind of the masses; and the active opposition of those whose private interests might suffer from the change.

Our present method for the care of tuberculosis was conceived in the panic that followed the discovery of the almost universal distribution of the germ of the infection, and nurtured in the previously accepted belief that it was extremely infectious, tediously chronic and always fatal.

In the studies of the disease in the new day, that is to say in the light of Koch's discovery, our first revelation was that it was not always fatal. No classic treatment was developed, however, and the debacle of tuberculin as a cure was not enough to destroy hope that there was still a safe, easy and sure cure forthcoming. Many fakers flourished about this time and some of them are with us even to this day.

One legitimate plan did arise from the chaos of that time, and that was the removal of the patient to a milder climate. This plan pleased everybody. It relieved the doctor of a case that he did not know very well what to do with; it took the patient out of the home, where even his nearest and dearest were learning to fear him; and it gave him hope, which in itself is a very good medicine.

The results would have been very good indeed if only those with a fighting chance were allowed to go, and if they had been provided with means to live comfortably and secure medical advice; but the hopeful and the hopeless cases, those with means and those without means, rushed to a strange land and tried to live and recover under conditions they would hardly have survived in health.

The second revelation was that cures were actually being made in the milder climates where the patient was supplied with rest, fresh air and nourishing food. This soon raised the question: was it not possible to have all of these things at home and perhaps in a greater abundance? There was fresh air and good food in every state in the Union. This was the thought that brought about the period of state and county sanatoria. We need not refer to the quaint conceit that these essentials for recovery must be administered in conjunction with the healing influence of the northern pine. I mention it here because these and other fads brought about the building of sanatoria awkwardly distant from the centers of population and the open market. This accounts for the location of our own state sanatorium, euphoniously called Ah-Gwah-Ching. In other states the fresh air complex drove them to the desert, where they fed their patients triumphantly on condensed milk and canned meat.

The work of building sanatoria was greatly impeded by those who still held that the change of climate was essential. The argument was largely led by those states that were anxious to capitalize on their sunshine and by men who had acquired some little notoriety as the heads of large institutions where the competition was not very marked. "By the streams of Ruben great was the debate," but it had very little to do with the battle against disease.

Immediately after the Great War the milder climate plan received a great impetus, not indeed through the medical profession, for how-

*Presented before the Lymanhurst Medical Staff, Minneapolis, March 26, 1929.

ever strange it may appear, the United States, with perhaps the largest and best equipped and best organized medical body in the world, put the care of the sick and disabled of the war in the hands of laymen who, in the name of that thing that seems to be more sacred to the people than the name of God Himself, economy, hired the medical attendants in the cheapest market.

Public opinion slowly recovered from the propaganda, backed by the government, that filled such places as Whipple Barracks and Fort Bayard with men from Minnesota, Montana and the two Dakotas who died of the hardships of transportation or the terrific change of altitude, both of these places being over a mile above the sea level.

The next revelation was that tuberculosis was not nearly so infectious as was supposed. In fact there are many now who believe that the healthy adult is almost immune. This has been demonstrated again and again in the marriage of the tuberculous and the non-tuberculous, where the non-tuberculous seldom comes down with the disease. It is not unusual to see the wife, after the death of her tuberculous husband, live and retain her health, while she loses, one by one, the children who were exposed to the disease during the life of their father, or the healthy husband surviving his tuberculous wife and children.

On the other hand, the susceptibility of the child is very high. The degree of fatality is not well known for it is only in late years that a doctor would dare the scoffs of the profession by reporting the death of a child from pulmonary tuberculosis. We do know that in many cases the vital forces of the child are so strong that they establish a "health balance" against the disease. We also know that this health balance can be upset by such affections as influenza or pneumonia or great physical strain. It seems from recent statistics that this breaking down of the health balance is becoming very frequent in girls of the high school age. This may be accounted for by their efforts to indulge in the sports of their brothers notwithstanding the handicap of the menses, the strain of the high school work and the social obligations that seem to complicate the school course at the present time. The records of the war show that the health balance broke with tragic frequency when the young boys were subjected to the strain of intensive training in camp. They developed fever after a few days strenuous work and in three weeks were dead of cerebrospinal meningitis or other tuberculous manifestations. The child as the host of the disease and carrying it on to the next generation is a problem that must be reckoned with, though not of course the only problem, but its protection looms large in the prevention of tuberculosis.

This last revelation and especially the part that refers to the susceptibility of the child and the possibility of it carrying the disease in a quiescent state until the strain of hard physical labor, childbearing, or disease breaks down the health balance that has been established, and the adult again becomes a source of infection to his own or his neighbors' children, is the stop, look and listen sign of this day. The key to the situation is the protection of the child. The protection of the child envisions the care of the adult.

With this picture in our mind we can now look for the weak parts in our system of the care of the tuberculous. We are spending millions in this fight and thousands of men and women are devoting their lives to the work, and we have a fairly educated laity. Where is the break in the continuity of our endeavors that renders our efforts so futile?

The weakest part, I am fully assured, is in the gulf that lies between the patient and the doctor to whom the care of the tuberculous is now consigned by the profession at large. This doctor is hidden in the seclusion of the sanatorium. The only power on this earth that can bridge that gulf is the family physician. The first, most important and most difficult step in the management of any case is the diagnosis, and this diagnosis must be made early—not after the neighbors have made it, but early, when it requires skill and training to do it. Now what chance are we giving the family physician to acquire this skill and training. He is a human being, struggling along to support his family in decency. He has not even the advantage of a hospital in which to study the case. When he makes the diagnosis, if he does, the case passes out of his hands, and his remuneration for his hard work is not very great. People do not like to pay for what they don't want to hear. Do you blame the doctor

for turning his attention to something that will offer more credit and more remuneration?

This is an "impasse." The sanatoria get the patients only after the disease has progressed so far that a diagnosis could be made in just running by. A second difficulty rises from the reluctance of the patient to leave his home surroundings until the disease is so pronounced that he is afraid. A third difficulty is that hopeless cases are usually sent home or return home to die, and are in the house, often with small children, during the most dangerous period of the disease as far as the spread of infection is concerned.

The fourth difficulty is that the sanatoria are filled up with bed patients and have not room for the applicants and the result is a long waiting list. During this wait, more precious time is frittered away, and the patient's chance for recovery passes with every day.

There is one simple direct remedy, which would cure all of these conditions, for they are all dependent on the one false step that was taken in the early care of the disease:

Open up the general hospitals, which ignorance of the true nature of the disease, and panic, not law or reason, has closed against the tuberculous. Let the study of tuberculosis again become a vital matter with the family physician. Give him the advantages of a hospital in which to study his cases and to care for them as long as they are hospital patients. Give the patient the advantage of a general hospital for his surgical needs such as lung collapse, resection of ribs or phrenic nerve, etc.

Such work belongs to a hospital and sanatoria should not be burdened with it. Then when the patient has made the first lap of his journey toward health, and when he is facing his long tedious recovery, he is a fit subject for the sanatorium, and the sanatorium should be fitted to meet this condition and not hospital conditions.

Empty the beds in the sanatoria of hospital patients and make room for the sanatorium patient and fill the empty beds in our hospitals with the patients that belong there. There is no doubt but that our state with an intelligent redistribution of the tuberculous could take care of them all competently without any further building program.

The effect of this action would be to revive the interest of the family physician, and to give us instead of a few thousand workers in the tuberculosis field a hundred thousand, and it would make the local physician what he was before he turned this work over to the sanatorium, the friend and adviser of the family that he serves; for in no condition is the doctor brought more close to the family than in the guidance and supervision of such patients.

As to the sanatoria, when this burden is lifted from them, they can enter the work that was their original purpose, the rehabilitation of the individual weakened by disease, and often rendered unfit to take up his previous occupation. This is a splendid field and a challenge to the best intelligence. As early as the fourth century we find that such rehabilitation work was carried on. Basil Bishop of Cæsarea in the hospital called the "New Town" from the number of its buildings gave us an example. Here the patients after their recovery were taught trades by which they might earn a livelihood, and there was a committee to make contact between them and those having work for them to do.

THE COST OF MEDICAL CARE

O. E. Locken, M.D.
Crookston, Minnesota

THE cost of medical care from a rural aspect is very completely described by the following story:

Late one stormy night a physician was aroused from sleep by a farmer who lived several miles out in the country. The farmer, who had a reputation for being stingy, inquired how much the doctor charged for country calls.

"Three dollars," snapped the doctor, impatient that the fellow would bargain under such circumstances. Thereupon the farmer urged him to go to his home immediately. So the doctor dressed and drove to the farmer's house with as much speed as the muddy, slippery roads permitted. As soon as they stopped at the farmer's home, the farmer stepped out, and handed the doctor his three dollars.

"But where is my patient?" demanded the physician. "There 'aint none," answered the farmer, "but that damn livery man would have charged me five dollars to bring me out here tonight."

I think, as far as rural Minnesota is concerned, that summarizes the situation.

It is estimated that since the war medical fees have increased only 35 per cent, whereas the cost of living has increased 66 per cent. The physician, like the farmer, has not kept pace with the development of a profitable industrial world. The cost of medical care is not the price paid to the physician. The cost of scientific medical care, like the cost of agriculture, as far as the consumer is concerned, has increased wholly by virtue of an apparently necessary overhead. In medical service that means scientific diagnosis and treatment, hospitalization, nurses and technicians, laboratories and *x*-rays, medicine, serums, and physiotherapy. All of these make the bulk of the medical bill. The patient, however, is not interested in the details; he is interested only in the total. The income of the physician for medical services today is in exactly the same relation to the bill which the patient pays as the income of the farmer is to the bill which the consuming public pays for its foodstuffs. To reduce the overhead of the cost of scientific medicine is not as simple a task as the industrial world has found the reduction of costs, through mass production and distribution, by division of labor and organization. The human element of life and health, of prevention and treatment of disease, cannot be standardized as simply as the commodities of a merchandising business world.

There never was a time when the cost of medical service has been before the public as it is today. First, free dispensaries and free hospitals, then pay beds on reduced rates in charity hospitals, then public pay clinics with under-cost rates supported by endowment or taxation, have each in turn focused our attention on the growing efforts to give scientific medical service to all of the people regardless of their financial status. The recent issue of medical ethics and lower costs of medical care fought in headlines and editorial pages of Chicago newspapers growing out of the methods of operation of the Public Health Institute, have brought a crystallization of ideas on the problem before us. Not taking time to argue the merits of that controversy, we are interested here only in the prevailing conclusions of the writers.

Quoting from the New York Times of April 21: "Is the socialization of health care to be intelligently and progressively developed, or is it to be checked by private physicians acting as an organized society for the protection of their professional privileges?"

Quoting from the Chicago Daily Journal of April 12: "Medical ethics doubtless will be adjusted by the profession to meet the new conditions. The health of a people is one of the prime objectives of civilization. An organized and methodical system whereby the best medical treatment is available to all who are ill must come eventually in this intelligent and progressive age. Society will shape its health program to suit its needs."

These are very strong statements coming from powerful newspapers. As expressions of prevailing public opinion they are based on two generally recognized criticisms of medical practice:

1. That scientific medicine is not available to the man of average income.

2. That there is a lag between the knowledge now in the possession of the medical profession and the application of that knowledge to the service of all the people.

A study by public health workers of the incidence of disease and death rates in various sections and communities gives a basis for reason-

ing that there would be now a saving of a half million lives annually in the United States without any further discoveries, if there was sufficient expenditures on the part of either the individual or the state, in the application of the present knowledge of prevention and treatment of disease to an equal standard in every part of the country. On the supposition that such a uniform standard of service is possible, the entire movement of Public Health is based.

The practice of medicine has been highly individualistic and the whole tendency of practice, with its personal relation between physician and patient, is to oppose the methods of organization typical of the modern business world. Ninety per cent of physicians are in single private practice and yet while there are only 147,000 physicians in the United States, there are more than 1,000,000 persons administering to the care of the sick. It is evident that there is in this individualistic profession a very high degree of organization, through hospitals, clinics, laboratories, public nursing, and administration. Organization in one form or another approaches the menacing cloud of state medicine. It is of interest to review what the state is now doing in this field. It provides our medical education; it regulates our medical practice; it controls a large bulk of hospital service; it supervises the entire field of contagious disease eradication. But more than that, the state cares for all the mentally defective by its public institutions, for practically all the tuberculous by its state and county sanatoria, for most of the orthopedic cases by its hospitals for crippled children. And each year brings a greater control of all accident cases under the direction of the Industrial Commission, and in the recent legislature we were but a step from having our fees for accident cases in industry specified by that body.

The lay workers and public health officials constantly declare that these activities are not sufficient, and so the frontier of public medical service is pushed out:

1. Great industrial concerns have organized complete health services for the purpose of caring for the workers in their plants. This has been followed by extending the privilege of making the services of the company doctor possible for the wife and children.

2. Trade unions and fraternal orders have provided the lodge doctor to care for all members of the order and their families on an annual fee basis, and this service is used as a main argument to induce new members to join the organization.

3. The University, for teaching purposes, provided charity services in dispensary and hospitals, and are now extending rapidly the pay bed on a low rate scale to attract a larger clientele. It was only a single step to include the Student Health Service of complete medical care to 10,000 students on the campus, for the payment of a small annual fee.

4. Corporation Clinics such as the Cornell Pay Clinic of New York, backed by University funds, and the Public Health Institute of Chicago, backed by private individuals of wealth, have employed physicians on salaried whole or part time basis, to put scientific medicine within the financial reach of the so-called middle class of limited incomes.

These are examples of the gradual trend of experiments to organize medical practice for the purpose of reducing the cost of medical care to the patient, by providing for the payment of overhead by some other means than by the patient himself. The scope of this paper does not permit a discussion of the merits or defects of these public efforts to organize medical services on a low cost basis. The question of interest here is, what are the physicians of Minnesota doing to meet this challenge of the problem of the cost of medical care?

Minnesota is essentially a rural state and the great majority of its physicians are serving a rural people by private individualistic practice. It is generally estimated that 85 per cent of illness can be efficiently cared for by the general practitioner without the aid of expensive equipment or technical assistance. For that demand there is no particular problem. Minnesota physicians as general practitioners are giving an adequate service for a reasonable cost, at a figure that brings no more hardship to the middle class of moderate incomes than do any of the necessities of modern life. To pay for such service by cash or out of income on an installment basis is no more of a burden than the purchase of furniture, automobiles or radios, which these same people find easy to acquire.

What of the 15 per cent of disease which by its nature requires technical assistance for either diagnosis or treatment?

In rural Minnesota scattered every hundred miles, one finds small group clinics with staffs

of three to ten men, with trained technicians, with complete scientific equipment, giving medical service modeled after the great parent institution, The Mayo Clinic. Here you find the principle of organization, as laid down in modern business, specialization, division of labor and cooperation. Scientific medicine on a high plane through these group clinics is being brought to the reach of everyone. The cost of service has been reduced by cutting down the distance which the patient must travel, and by the fact that a group of men can afford to purchase all the equipment necessary, and to employ the technical assistants necessary for that service. The cost to the public of scientific medicine in rural districts has been reduced until it is no more of a burden than the general cost of living. One finds practically no complaint arising from these sources.

The third factor in medical care is the detached specialist in the smaller city and in the metropolitan centers. He has in the past not been generally available for the average man of small income chiefly by the excessive cost of reference to technical laboratories and to additional consultations which, added to the original specialist's examination, has made a burdensome total.

The latest effort to meet this problem is the organization of technical laboratories by coöperative control of a large number of physicians themselves, making possible greatly reduced charges for special technical laboratory procedures, *x*-ray services, and physiotherapy. A step further will change the construction of medical office buildings, where one waiting room and one office girl will supply the needs of ten or twenty individual physicians, eliminating expensive floor space, and a great number of office girls, who spend a fair share of their time now doing needlework, or reading light magazines. As the overhead goes down, the charge to the public will represent more nearly the net income of the physicians.

The fourth problem is the cost of hospitalization which with the great advance in technical demands has increased out of proportion to the cost of other branches of medical service. There seems to be no visible means to reduce the cost of doing business to the hospital management. which today as a rule is under most efficient supervision, equal to any business of like proportions.

Universities today give educational services to students at a rate of less than the costs covered by the income from tuition fees. The deficiency is made up by public taxation. The private college offers similar service on a similar basis, but the deficiency between the cost of service and tuition income is made up by endowments or annual grants from supporting church organizations. This course offers the only apparent solution to the cost of hospital service. Hospital rates, like tuition fees, can be no higher than the traffic can bear. If the rates are to come down and the services kept up to an increasingly higher standard, then the hospitals can do no charity work, and they must receive the balance of their needed income either through public taxation or from private endowment, exactly as public and private colleges are maintained.

In conclusion of this brief panorama of medical economics, permit me to emphatically declare that these steps in providing a superior scientific medical service by the private physician, working on his own responsibility, either individually or in groups, is immeasurably better than medical service coming out of Public Clinics with an all salaried profession, organized on a factory or department store principle. Socialized medical service will always fail to provide for the personal interest between patient and physician, will fail to provide a responsive flexible service for the acute case, for the night case, for the contagious case, for the chronic case of the laboring man, who is unable to take treatments during the usual working hours of the day.

The President of the United States has declared that government in business is a blight to the progress of business development. If this is an axiom of sound economics, how much more true it is that the public can expect an advancing medical service only in so far as there is maintained the initiative of the individual both in the patient and in the physician.

Minnesota can be proud of the fact that its medical profession is meeting the challenge of adjusting itself to modern conditions and is providing a superior service of scientific medical care at a cost within the reach of all its citizens.

REFERENCES

Davis, Michael: Clinics, Hospitals and Health Centers, Harper, 1926.

Moore, H. H.: American Medicine and the People's Health, Appleton Co.

President's Letter

COUNTY MEDICAL SOCIETIES

MOST illuminating have been our visits to County Medical Societies. Upon their life and vitality depends the integrity of the parent organization. They must ever be the superstructure of the State Association. To them the State Association owes much. The interest displayed in up-to-date medical topics, the character of papers presented, the intelligent and interesting discussions, the keen interest shown in postgraduate courses, the activities of the officers, especially of the secretaries, augurs well for the future. One is forced to the belief that the component County societies for the most part believe that progress is essential, for without progress there is ever retrogression. The spirit of mutual helpfulness and the harmony everywhere apparent is encouraging and inclines one to the belief that all are working for the common good. This is as it should be for upon the integrity of the County Society and the loyalty of its membership depends the success of the State organization. So long as we continue to have County societies active in their own communities, and as deeply interested in the growth and success of the State association, we have no need to fear the future. The younger generation, guided as they doubtless will be by the unselfish and untiring devotion of their elders to their professional traditions, will take care of that. If we are to perpetuate the ideals of our forebears in medicine in this State we must see to it that a proper standard is maintained within our own ranks, that the underlying principle of ethics be the golden rule and that he who perverts an honorable profession to his own selfish ends is to be regarded as unfit in every way to minister to the "ills that flesh is heir to."

President,
Minnesota State Medical Association.

EDITORIAL

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MEDICAL ALUMNI HOMECOMING

Minnesota Medical Alumni will have the opportunity of combining a one-day medical meeting with their visit to Minneapolis for the homecoming football game with Michigan, November 16. The committee of the Minnesota Alumni Association, of which Dr. J. B. Carey is chairman, has arranged an interesting program for Friday, November 15, which appears elsewhere in the journal. This is in the nature of an innovation and if well patronized is likely to be continued in the future.

Those who have not visited the campus in recent years will be interested in making a tour of the recent additions to the medical buildings, which will be made Saturday morning at 10 o'clock. Three years ago the first wing of the University Hospital was completed to house the Cancer Research and the Eye, Ear, Nose and Throat departments. The much larger second wing of the hospital is practically completed. The new University Dispensary, which is the last word in physical equipment and is probably not surpassed by any other outpatient department, has been recently opened and the Students' Health Service has moved into its new quarters at the extreme end of the new wing. The part of the wing known as the Eustis Memorial Hospital for Crippled Children, including the pediatric department, will probably be in operation by the middle of November.

Mention should be made too of the new Northrop Memorial Auditorium just completed, which was made possible by contributions of Minnesota Alumni. It is, briefly, a magnificent structure.

Those who arrange to attend the scientific program on Friday will be able to take part in the various homecoming activities arranged for Friday evening. The occasion is one which will doubtless appeal to many alumni, more especially those located outside the Twin Cities.

REGULATION OF *X*-RAY FILM STORAGE

Following the Cleveland disaster, both the public and the medical profession were aroused to the danger of fire from *x*-ray films. In addition to their great inflammability, the danger from the poisonous gases generated by heat was most tragically emphasized. From experimental evidence before the War, this danger had been known to many physicians and to the film industry and had inspired the Eastman Company in the production of a new non-inflammable film. This film burns with difficulty and is not explosive. The only dangerous gas generated from it, as far as is known, is carbon monoxide, and this only in the presence of a limited oxygen

supply, which is true of any organic matter burning under similar conditions. The State of New York therefore attempted a solution of this problem by prohibiting the use of inflammable films.

In the State of Minnesota, the authorities in the three larger cities have been working on this problem for some time. In 1927, Minneapolis passed an ordinance controlling the handling and storing of *x*-ray films. This ordinance embraced the regulations of the National Insurance Underwriters' Association and, in the opinion of *x*-ray men, adequately covered the situation. Practically no attempt was made, however, to enforce this ordinance. In April, 1929, the 1927 ordinance was amended with the best of intentions but, unfortunately, without consultation with *x*-ray men, who were the only group able to give practical information on this subject. Many of the regulations in this ordinance, therefore, were based on purely theoretical grounds, such as the construction of separate vents to the roofs of buildings regardless of their height; specifying the exact construction of fireproof cabinets and their height from the ground in inches; limiting the amount of films to be kept in such cabinets to fifty pounds, which is far below the amount necessary in the routine practice of roentgenology; placing viewing rooms in hospitals and other institutions in the story next the roof, etc. If enforced, these regulations would result in great financial sacrifice on the part of the men who use the *x*-ray.

Next, the State Industrial Commission took the matter up with representatives from the three larger cities in Minnesota with the intention of passing the same ordinance in all of these cities and at the next session of the Legislature embodying these regulations in a State Law. A number of the men in the profession learned of this attempt and letters began to pour into the office of the Secretary of the State Medical Association. President Christison turned the matter over to the Legislative Committee for investigation and the members of this committee, in coöperation with the local societies, have been working on this problem. The city authorities have shown their willingness to take a reasonable attitude, and as far as the situation in the three larger cities is concerned a satisfactory and safe solution of this serious and perplexing problem is on its way.

If there was unanimity of opinion as to the relative efficiency of inflammable and non-inflammable films, a permanent solution would be easier. Many believe that the non-inflammable films are just as efficient as the inflammable and if more generally used would cost no more. If this is true, then the New York law would largely solve the problem in the near future. There would still be, however, an enormous amount of inflammable films to be stored, both because of the necessity of keeping films on file for two years to conform with the State Law, and for scientific purposes for many years longer. It would seem as if this whole question should be carefully considered by the State Medical Association and, if a law is to be passed, let the Legislative Committee father a law which would be practical and easily enforceable and still meet the requirements of reasonable safety.

In conclusion, we must realize that *x*-ray films are not to be handled carelessly or stored in unsafe places. An educational campaign carried on in local societies by speakers familiar with this subject would go a long way in preventing catastrophes such as that which occurred in Cleveland.

C. B. Wright, M.D.

IRRADIATED ERGOSTEROL AND COD LIVER OIL IN THE PREVENTION OF RICKETS

The anti-rachitic property of irradiated ergosterol was discovered in 1924. Ergosterol preparations have been used quite extensively in England, France and Germany but were wisely withdrawn from the market in this country because of the danger of overmedication from lack of standardization.

Recently this product has become again available, since its standardization on the basis of annual tests rather than on the unit basis has made the dosage reliable.

The Council of Pharmacy and Chemistry of the American Medical Association has recently accepted, under the name of Viosterol, preparations of irradiated ergosterol in a vegetable oil having 100 times the anti-rachitic potency of high grade cod liver oil. The proper dosage of

this product as recommended by Hess[1] and his co-workers and others after considerable clinical use has been determined as follows:

For the prophylaxis of rickets in normal growing infants—8 to 10 dops a day

For premature or rapidly growing infants—15 drops a day

For the treatment of rickets in mild cases—15 drops a day in moderate cases; 20 drops a day in severe or late cases; larger doses for short periods of time.

He recommends its administration for only a few weeks at a time, and when larger doses than those recommended are given, the blood calcium should be checked at intervals.

A second preparation of irradiated ergosterol has been put on the market which is a combination of this substance with cod liver oil whereby the potency of the cod liver oil is increased five times. When we consider that even double the dose of 1 dram of good cod liver oil three times a day is often inadequate to prevent the development of rickets in a rapidly growing infant (and it is impractical to give a larger dose than this) the value of this combination is apparent. The dosage of this combination is placed at ½ to 1 dram three times a day.

The use of irradiated ergosterol preparations is a distinct advance especially in the treatment of rickets and should replace cod liver oil and the ultra-violet ray as a curative measure. It should be remembered, however, that this product contains only the anti-rachitic vitamin D, whereas cod liver oil also contains vitamin A, which is so essential to growth and according to Green and Mellanby[2] is also of distinct value in affording resistance to infection.

Isolated reports indicate that irradiated ergosterol is curative in osteomalacia. There is some reason to believe that it may prove of value, too, in the treatment of Paget's disease, although it should be used with caution in any condition in which endarteritis exists.

1Hess, Alfred J., Lewis, J. M., and Rivkin, Helen: The status of the therapeutics of irradiated ergosterol. Jour. Amer. Med. Assn. (Aug. 31), 1929, 93:661.

2Green, H. N., and Mellanby, E.: Vitamin A as an anti-infection agent. Brit. Med. Jour., Oct. 20, 1928.

HISTORICAL COMMITTEE

We have returned from our vacation, and find our Editor has used up the material we furnished him last winter.

In February we read in the papers that the Italian consul in New York wanted a New York barber arrested because he looked and dressed like Mussolini and the Duce didn't like it. That reminded us that a Saint Paul physician was arrested in Switzerland in 1854 as it was supposed that he was Joseph Mazinni, the Italian patriot. He told the Swiss police he was an American physician. So to test him, his inquisitors asked him about yellow fever. When he stated he had never seen a case they were doubly sure he was an impostor, "as is not yellow fever an American disease?" Of course, in those days to most Europeans America was all alike from Argentina to Quebec.

At any rate he got out of jail after ten days in a small cell on a bread and water diet.

We found these "Old Docs" interesting men in many ways. Let Dr. H. M. Workman at Tracy know what medical men lived in your town in the early days, and what you know about them.

J. M. A.

THE AMERICAN CROSS CHEMICAL COMPANY

The American Cross Chemical Company is one of the trade names used by W. H. Paxton of Birmingham, Alabama, in the sale of his nostrums. Other names used are Pax American Cross Chemical Co., and American Cross Bearers. W. H. Paxton is a colored man who for some years has been engaged in selling "Pax 2 New Life Savers Compound Syrup of Fruit Juices" and "Pax 3 in 1 Healing Antiseptic and Liniment." In a prosecution by the government it was brought out that the so-called New Life Saver Tonic was said to consist of a mixture of pineapple syrup, vanilla extract, extract of blackberries, glycerine and fluid extract of juniper berries. Paxton's "Healing Antiseptic and Liniment" was said to contain glycerine, fluid extract of pokeroot, oil of lavender flowers, oil of juniper berries, oil of sassafras and fluid extract of blackberry. Paxton claimed that his nostrum would cure cancer, gonorrhea and many other specific diseases and ailments. The Post Office authorities have issued a fraud order against the American Cross Chemical Co., Inc.; Pax American Cross Chemical Co., Inc.; American Cross Bearers; W. H. Paxton, President, and Mrs. Cassie Bell Paxton, Sec.-Treas., thus denying the use of the mails for the furtherance of the sale of the nostrum. (Jour. A. M. A., September 7, 1929, p. 788.)

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

The medical profession of Minnesota is realizing the value and becoming more active in participation in public affairs. The Saint Louis County Medical Society is outstanding in this respect. The Society has accepted the invitation of the Duluth Chamber of Commerce to take over one evening of the program of their Industrial Safety School. The idea is to supply speakers to the seven sections of this school: railroad and mining, woodworking, machine and metal, all trades, dock and elevators, truck drivers, and electrical workers. There will be from one hundred to three hundred men at each of these sectional meetings. The subject is to be "Periodic Health Examination in Industry" with a suggestion of the effect of the various industries on health. A general session will follow these sectional meetings at which all the groups will unite in joint session.

The St. Louis County Medical Society maintains an active Speakers Bureau and many talks are given at Parent-Teacher Association meetings and other similar groups. The Society cooperated in sponsoring a successful program during Baby Week.

A series of Medical Economics meetings will be held throughout the State in connection with postgraduate courses at the various sanatoria and a series of health meetings conducted by the Minnesota Public Health Association. The meetings scheduled are:

October 29—Wadena, Fair Oaks Sanatorium
October 30—Lake Park, Sand Beach Sanatorium
October 31—Crookston, Sunnyrest Sanatorium
November 1—Bemidji, Hotel Markham
November 4—Fergus Falls, River Inn
November 5—Alexandria, Alexandria Hotel
November 6—Montevideo, Dunn Hotel
November 7—Marshall, Atlantic Hotel
November 8—Worthington, Hotel Thompson

Perhaps the views of Dr. Harry Hyland Kerr, president of the Medical Society of the District of Columbia, concerning the practicality of "State Medicine" will help us clarify our own thinking. He says:

"State Medicine means the placing of the responsibility for the health of the people in the hands of the State. Now, if State Medicine were good medicine no possible objection could be made to it because what we are striving for ultimately is the good of the patient, the elimination of disease with the least economic and physical loss. But as I see it, State Medicine can never equal Medical Practice as it has now developed. In the past the practice of medicine has been essentially an individual relationship between the doctor and patient. The patient employs the doctor directly and the doctor assumes the sole responsibility for his patient's well being. Both know that the Doctor's reputation depends on his success. . . . When the State undertakes the responsibility and delegates the care of its sick to salaried doctors the standard of practice will immediately drop.

" . . . The truth is that State Medicine is already here and is now gravely altering the medical profession to a profound degree. Here in Washington there are numerous examples where the members of the Medical Society are robbed of their livelihood by the government and other services. The numerous dispensaries run by the government departments, the so-called welfare clinics and medical services of large corporations are taking the medical care of their employees away from the family doctor to turn it over to the salaried physician. It is high time that we realize the situation as it is today and not wait until we are confronted with the actual legislation foisted on the District of Columbia as an example to the rest of the country.

" . . . The education of the laity should be an important function of the Medical Society. We should have a Speaker's Bureau where the lay organizations could obtain an authoritative speaker on any of the many medical questions in which they are constantly seeking enlightenment. Such a speaker should be the mouthpiece of the Society and appear as its delegate."

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA SOCIETY OF INTERNAL MEDICINE

St. Paul, Minnesota—November 11, 1929

TENTATIVE PROGRAM

1. Report of a case of esophageal diverticulum — Dr. A. H. McFarland
2. Experiences with sodium sulphocyanate in hypertension — Dr. J. F. Borg
3. Contribution to the physiology and pharmacology of the kidney — Dr. R. M. Beiter
4. Title not yet given — Dr. H. M. Connor
5. Title not yet given — Dr. J. C. Carey
6. Title not yet given — Dr. A. H. Beard
7. Excretion of congo red by the kidney. Preliminary report — Dr. A. M. Snell, Dr. N. W. Barker
8. Title not yet given — Dr. Hilding Berglund
9. History of local medicine — Dr. A. S. Hamilton
10. Modification of cardiac physiology by digitalis with its clinical application — Mr. John Cowan
11. A case of right coronary occlusion — Dr. Ralph Warnock
12. A discussion of trauma occurring to the thoracic and abdominal viscera from severe external injury without external bruising or laceration, and with particular reference to damage to the heart muscle and its conducting mechanism — Dr. E. L. Tuohy

This will be an all-day meeting at the Town and Country Club, Saint Paul. Luncheon will be served and also dinner.

All physicians are invited to the morning and afternoon meetings.

E. L. GARDNER, M.D.
Secretary.

CLINICAL MEETING OF THE MEDICAL ALUMNI, UNIVERSITY OF MINNESOTA

Friday, November 15, the day before the homecoming for Minnesota alumni, has been selected for medical clinics to be held for the medical alumni of the University by the Medical Alumni Association. The entire day will be given to addresses and demonstrations in the new Eustis Memorial Auditorium.

The following program has been arranged:

8:30 The Value of *X*-ray Studies.....Dr. Leo Rigler
9:30 Infant Feeding.....Dr. W. Ray Shannon
9:30 Diagnosis of Abdominal Pain....Dr. E. L. Tuohy
10:00 Sugar in Blood and Urine.....Dr. Otto Folin
11:00 Functional Disturbances Simulating Organic Disease .....Dr. Ernest M. Hammes
11:30 Treatment of Acute Intestinal Obstruction — Dr. O. Wangensteen

The chairman of the morning session will be Dr. W. A. O'Brien.

Luncheon will be served at the hospital.

1:00 Common Skin Diseases and Syphilis — Dr. S. E. Sweitzer
1:30 Cancer of the Uterus.....Dr. J. C. Litzenberg
2:00 Teaching of Medical Experience — Dr. George D. Head
2:30 Clinical Significance of Infections of the Prostate Gland.....Dr. W. F. Braasch
3:00 Poliomyelitis.....Dr. Jay Durand
3:30 Treatment of Fractures.....Dr. Emil Geist

Dr. E. L. Tuohy will preside at the afternoon session.

Following the afternoon program certain very important matters will be taken up at the business session of the association.

Friday evening will be devoted to the various homecoming activities preceding the game Saturday.

ST. LOUIS COUNTY MEDICAL SOCIETY

The St. Louis County Medical Society has arranged the following program for the Industrial Safety School which will be held December 4, in Duluth:

Railroad and Mining—"Disabling Sickness Among Workers" ..... F. J. Hirschboeck
Woodworking—"Tuberculosis in Industry" — D. W. Wheeler
All Trades—"Mental Hygiene and Efficiency" — L. R. Gowan
Machine and Metal Workers—"The More Common Bone and Joint Injuries".....J. R. Kuth
Dock and Elevator—"The Neglected Common Cold" — E. E. Webber
Truck Drivers—"The Health Hazards of a Truck Driver".....C. L. Haney
Electrical Workers—"Physical Examination in Industry" .....M. M. Fischer

GENERAL SESSION

Introduction of Speaker of the Evening by President-Elect of the Minnesota State Medical Association .....S. H. Boyer
Personal Health and Efficiency.....W. A. O'Brien

HENNEPIN COUNTY MEDICAL SOCIETY NEW HOME CELEBRATION

The formal opening of the new home of the Hennepin County Medical Society in the new Medical Arts Building, Minneapolis, was the occasion for a three day celebration, September 26, 27 and 28, 1929. The new building was appropriately decorated from the street entrance to the society headquarters on the twentieth floor and the society rooms themselves were liberally decorated with flowers and ferns.

The program of the first evening was attended by about four hundred members. A musical program preceded the following addresses:

DR. N. O. PEARCE, president of the society.—

Almost 75 years ago, in a little frontier settlement on the banks of the Mississippi River, just above the falls of St. Anthony, a group of pioneer physicians

gathered in the residence of Dr. A. E. Ames, and, for the purpose of interchange of medical knowledge a nd regulation of their professional conduct, organized themselves into what was known as the Union Medical Society, a name that was sixty years ago changed to the present name, the Hennepin County Medical Society. The charter members were nine in number.

Our historian, Dr. Arthur Hamilton, after an exhaustive search, gathered the information that the meetings were held twice monthly and that much time was devoted to the discussion of problems of medical ethics, public health, and essays on disease. The meetings usually ended in a social function of some sort.

I suppose that the founders of this Society on that historic occasion little dreamed that they were laying the foundation for this gathering tonight, in this beautiful building, representing an organization of 520 physicians in a city of nearly half a million people. Neither could they conceive of the wonderful progress to be made in the science of medicine and surgery in this short period of less than 100 years. Tonight we are taking part in another historical event in the life of the Society and, as I turn my thoughts to the far future, I wonder what kind of a group will be holding a meeting of the Hennepin County Medical Society 100 years, or, better, 500 years hence, and will some future historian of the Society recite the events of this occasion and possibly see in our present conception of disease, its diagnosis, and treatment, as much that is queer and possibly humorous as we now do in looking back on the ideas entertained by the pioneers of this organization.

Tonight opens a new era of activity in the life of this Society. With the conveniences and comforts of this new home, it will be possible to carry out a program of scientific, business, and social activity which will mean much for the advancement of physicians and benefit to the citizens of Minneapolis.

I wish to express on this occasion the appreciation of the officers of this Society for the wholehearted and almost unanimous coöperative participation of the members in making it possible for the Society to acquire these new quarters and facilities. To Mr. Clifford and his associates, we wish to express our profound thanks for their generosity in expending so much to give us pleasant and delightful surroundings; to Mr. Yeates goes much credit for his vision and tenacity of purpose in the creation of this beautiful structure; and to Mr. Tyre, Mr. Johnson and Mr. Madsen our thanks for their interest, helpfulness and patience in working out many problems. We express our thanks to Mr. Kellogg, who is responsible for the decorations of the lounge, and it is a pleasure to publicly thank Mr. Danielson for his generosity in providing the floral decorations for the celebration. I am sure you would not like me to close without a word of appreciation to all the committees who have worked so conscientiously to make all this possible. It is hard to mention any one individual without mentioning many but I would feel remiss in my duty did I not call your attention to the generous service of Dr. Erb and Dr. Benjamin and their building and financial committee. And lastly we express our appreciation to the Women's Auxiliary for presenting the Society with the chairs and drapes for the auditorium and for their participation in the new home celebration.

Dr. Phillips E. Osgood, pastor of St. Mark's Episcopal Church, Minneapolis.—

The opening of these rooms is symbolically significant of your ideals. The morale of the medical profession is first of all dependent upon your initial oath of ideals, but the glad sincerity and enrichment of its keeping is dependent on high-hearted, intimate comradeship in developing experience.

I know of no profession which more rigorously holds itself to the authority of standardizing ideals. Constantly, and, it is to be believed, selflessly, the medical profession sets its concepts high. Its reach deliberately exceeds its grasp. Its ideals are ideal ideals. They forbid easy content and mental crystallization. They continually command you forward.

You have honored me with the appointment as your Chaplain-of-the-moment. I am gratefully aware that in this selection it is your principal motive to bring into this occasion one who as a clergyman symbolizes the spiritual implications of our common life and work. I am reverently aware that my fortunate choice as this clergyman is not so much a personal compliment as a reverent recognition of the ultimate cause to which alike we consecrate ourselves, each in his field.

Therefore, we dedicate these rooms, and each of these purposes is a spiritual purpose. Each of these is in the interest of the medical profession and its service in this community. May we ask you, therefore, that we may definitely show the moment the dedication takes place, when I say certain sentences which I know come from your hearts and of which I am merely mouthpiece, to rise:

To the mutual interchange of experience, whereby the experience of one becomes the wisdom of others,

We dedicate these rooms.

To the standardizing of our practice by mutual inspiration and the unostentatious witness of what we are and of our unpretentious sense of honor,

We dedicate these rooms.

To the informalities of intimate converse; to the pleasantries and intimacies of sheer friendliness,

We dedicate these rooms.

To the betterment of our special expertness and to the ennobling of our realizations of human values; to the validation of our responsibilities; to the sane emotion of helpers in time of need; to the consciousness of the wide variety of specializations contained within the one function we serve, corresponding to the multiplicity of human needs contained within one human need—for the realization of these and more,

We dedicate the opportunities provided by these rooms,

and in the humblest consecration we rediscover the duty of the medical profession and dedicate ourselves to the fulfillment of our duty, saying humbly: "So help us God." Amen.

Dr. Malcolm L. Harris, president of the American Medical Association.—

Ladies and Gentlemen:

One of the great pleasures which come to the president of the American Medical Association is the opportunity it affords him to visit the different sections of the country and meet so many active men who are engaged in professional work. The numerous activities which come to the president I look upon as compliments to the office and to the association, and not as personal tributes to anything which I may have to say, but as long as I am in the presidency I feel very much like the Scotchman in Scotland, where the good woman came rushing into the house and cried: "Jimmie, the neighbor's coo is in the yard." "Woman, dinna waste time here. Pay us back in milk before she gets oot." That is what the profession seems to be doing to me while I am in the presidency. But it is a great pleasure and inspiration to one who feels deeply in the welfare and progress of the profession, to be present at the dedication of this beautiful home of this Society.

To dedicate a new building is an old and honored custom dating at least to Moses, who is reported as having said to his people: "Where is the man that hath built a house and hath not dedicated it." Dedication is the consecration for convictions to duty toward a purpose or cause which commonly had a religious aspect.

Religion and medicine seem to have appeared in the mind of primitive man practically simultaneously, and went along for some time together. Religion and medicine had a common origin in the sense that they both had their origin in emotions, but the emotions which gave rise to medicine and those which gave rse to religion are very different, and for that reason medicine and religion soon parted company. The emotions which gave rise to medicine are those of sympathy and pity, which inspire in man the desire to relieve human suffering. The emotions that gave rise to religion are those of awe and fear of the unknown, or a mysterious supernatural force that had to be propitiated, or whose good graces were to be sought in forms of worship as exemplified in the various forms of ritual. Every great movement in the world has had emotion as its origin. Emotion is the basis of civilization, but for a given emotion to create the same feeling or result in a uniform reaction, it is necessary that there be developed an emotional culture, which has a binding or unifying force. Every religious sect has its emotional culture in its very form of worship, or in its ritual. Medicine, too, has its emotional culture in the form of principles of medical ethics, which have always been an inspiration to the profession and whose principles are just as sound today as they were when they were first enunciated.

Then let the association here dedicate this new building to the good of humanity; to the relief of human suffering and to a very conscientious and clear understanding and regard for the principles of medical ethics as expounded and promulgated by the American Medical Association.

Dr. William J. Mayo, Mayo Clinic, Rochester, Minnesota.—

It is certainly a pleasure and pride to me to be with you here tonight and felicitate the Hennepin County Medical Society upon these splendid quarters that they have for their future work. There is something I had in mind that the president has remarked upon and that is: The Twin Cities are great centers of education and the great leaders in all lines of thought, including medicine, and we down at Rochester, only 100 miles south, feel that after all we are only a suburb of Minneapolis and St. Paul, and we are grateful for the opportunity to meet with you as part of your body.

Now, there is something significant in the dedication of these rooms and the dedication of this building which is to be occupied by doctors. If we go back to the earlier times in medicine (and I wish to say we could go back a number of years) we find that doctors are great individualists. We have the greatest difficulty in an organization in which we can work comfortably with each other, and that has been so absolutely essential in the practice of medicine in the past, because each man within himself must find his needs and sources of action which enable him most to take care of the patient. Myself for one am not able to know more than a small part of some one of the various sources of information. What are we going to do? We are dedicated to the care of the sick. We no longer individually and personally can take care of the sick as we did in our fathers' time. The time has come when we must come toegther, because it is only as we can call upon each other as sources of specialized information that we can do our duty by the patient. And so we see in this building the home for the type of organization that will permit us each one to secure from each other those types of knowledge that are the highest of construction and those aids that will enable us to carry out our intentions to the people. So, as we look at medicine, at least from my standpoint, we are looking at medicine of a new type to that of our fathers. We look to organized medicine in which each one will play his part, not as an individual but as part of a group or army, and it is only as we recognize this necessity for group practice of medicine are we going to be able to do our duty by the patient.

Now, it is easy to see that this union must be an organic one. I do not know personally of any practice of medicine that is practised alone. We are calling unconsciously upon the Health Department for all those sources of information that will help us take care of a case. We are calling upon the *x*-ray specialist—unconsciously—no longer an individual but only one of a group. We must not think that this change does not necessitate organic union, but in some such manner as you are attempting to achieve here are we going to be able to organize the profession as a whole for the practice of medicine, in which each man will reserve his individuality and still will be able, through his sources of information, to give the patient that which he has a right to have, and which it is the best for modern medicine to give.

Dr. J. T. Christison, Saint Paul, president of the Minnesota State Medical Association.—

Ladies and Gentlemen of the Hennepin County Medical Society:

I can assure you that it is with a great deal of pleasure and satisfaction that I am able to be here tonight to bring you the felicitations and congratulations of the State Medical Society and of the sister Society of Ramsey County.

I do not believe it is incumbent upon me to say very much upon the question of dedication. This charming ensemble, from the roof garden and the library to this room, is evidence of a wonderful accomplishment. This is a wonderful age in which we are living. Ever and anon, across the intervening years, there comes into the range of our vision a man of accomplishment; a man who has done something out of the ordinary. An achievement if you please. One is reminded of the first verse of that poem, "The Bridge Builders."

"They builded magnificent bridges,
Where rivers and highways go;
They persistently mounted ridges
And where great rivers flow.
There was never a land so distant,
There was never a one so wide,
But the mind of man insistent,
Crossed to the other side."

The "it" of achievement.

Let us hark back to two or three years ago, to that achievement of Lindbergh's. If someone had said to us five or six years ago that that sort of thing could be done, we would have said: "No, it cannot," and yet, here's a man that goes out and does the virtually impossible. Here's our own Harrison Johnson, hopelessly, apparently, beaten out there in California, and with the power and force of nerve, comes back and brings to the State of Minnesota the amateur golf championship. These men are classed as those who have accomplished wonderful achievements. Let us take, for instance, the gentleman who preceded me. Many years ago, when he was a young man, he had a vision—a vision of a great clinic. A vision of group medicine. Some of his good friends scoffed at the idea, but he did not give up. He had a firm and fixed determination that he was going to accomplish something, and today you and I know that from every portion of this globe, the lame and the suffering flock to Rochester. Why? Because of that man who had vision; because of the fact that his determination and his power of discernment have enabled him to realize that vision of his young youth. He has been honored as no man of the medical profession has, so far as I know, ever been honored. Great universities all over the world have conferred upon him honorary degrees, and I venture to say that if by some accident he had been born in that tight little island where his father was, we would have addressed him at least as "Sir William" if not "My Lord Rochester." And yet he knows the love and affection that we all bear him. That our hearts are filled with the admiration that we have for him, and he knows what we mean when we address him as "Dr. Will" (and "Dr. Will" it always will be to us, and "Dr. Charlie" his brother). We don't think of it as the Mayo Clinic, but as Will and Charlie. I remember years ago I used to go to Rochester. I didn't go then to visit the Clinic, but there was a group of individuals there who used to give the most charming parties you can possibly imagine, and I can remember seeing Will and Charlie get into their old cutter and go off somewhere to make a call for $15 or so.

Today we see another accomplishment. The vision of some individual has brought about these beautiful quarters of the Hennepin County Medical Society. And the members of the Society inconsequentially sit back in their chairs and say they did it! They didn't do it at all. Some individual's vision has brought this about. There were many committees, doubtless, back of it, who helped with the work, but some member's vision brought about the result that we are now dedicating. Of course I, as our good friend Dr. Pearce said a moment ago, feel just exactly as much at home in Hennepin County as I do in Ramsey County. I have come over to the Hennepin County Medical Society meetings many times. Sometimes I have discussed medical subjects; sometimes I have come over here to try to sell you something, but I must say I have never attended any county society where I have received a more cordial reception to anything that I ever had to ask as president or member of the State Legislative Committee, than from the Hennepin County. It is certainly a privilege and a pleasure to again congratulate you on the culmination of this wonderful idea. Whose idea it was I don't know or for the moment care. We in Ramsey County are not going to be envious of you. Perhaps we will come over here from time to time to ask you to permit us to enjoy these comfortable rooms and stand out on the balcony and look over your wonderful city. Dr. Pearce spoke of 100 or 500 years hence. There will not be any Twin Cities then; there will be one great community. The end-result of all this to my mind should be summed up in an earnest desire on the part of the members to promote harmony, promote good will, avoid bickering and treat each other member of the Society as you would like him to treat you.

Following the dedication exercises those present viewed the new quarters.

On Friday morning Dr. Fred L. Adair, Professor of Obstetrics and Gynecology, University of Chicago, gave a very interesting clinic on "Syphilis of the Mother and New Born Child," and was followed by Dr. Harry M. Richter, Prof. of Surgery, N. W. Medical School, Chicago, who showed a large number of patients, confining his remarks largely to surgical conditions of the thyroid gland and the abdomen. He was followed by Dr. William Braasch, of Mayo Clinic, Rochester, who showed a number of patients, many lantern slides, and gave a masterly clinic, emphasizing the importance of the urological examination in the general scheme of physical examination. During the afternoon a large number of people attended the reception, when the Society rooms were open for inspection by the public. At the same time, the Minnesota Medical School Alumni Association held their annual golf tournament on the Woodhill course. The large silver cup which was won last year by Dr. C. L. Oppegaard, of Crookston, Minn.,

this year fell to the masterly golf of Dr. J. M. Culligan of St. Paul. Drs. Turnacliff and Culligan both had fine 77's, the difference of one stroke in handicap giving the cup to Dr. Culligan. On Friday evening, a dancing party was attended by many of the members and visiting doctors and their wives, the women of the Auxiliary welcoming the opportunity to see the new home where they will carry on their activities in the future.

Saturday morning was devoted to medical clinics given by Dr. Ralph Kinsella, Prof. of Internal Medicine, St. Louis University, St. Louis; Dr. William S. Middleton, University of Wisconsin; and Dr. L. G. Rowntree of Mayo Clinic. The clinics were very well attended, many visitors from outside the Twin Cities coming in for the occasion. On Saturday evening a boxing ring was set up in the auditorium and a large gathering of physicians and their friends enjoyed a stag smoker and supper, with vaudeville and boxing for entertainment.

The members of Hennepin County Medical Society are taking great pride in their new quarters and expressed themselves as delighted with the opening program.

LYON-LINCOLN COUNTY MEDICAL SOCIETY

A special meeting of the Lyon-Lincoln County Medical Society was held at Tracy Thursday, September 19. At a noon luncheon meeting of the Kiwanis Club, Mr. F. Manley Brist, attorney for the State Board of Medical Examiners, addressed the members on "Quacks and Quackery." In the evening a joint dinner meeting with the members of the County Dental Society was held at the Antlers Hotel, at which there were also present Dr. F. H. Aldrich of Bellview and Mr. Frank W. White of Marshall, representatives for the second and seventh districts, respectively, in the 1929 Legislature; Dr. H. M. Workman of Tracy and Dr. L. Sogge, Counsellors; Dr. H. M. Johnson, chairman of the Legislative Committee; Dr. C. L. Sherman of Luverne, Dr. George B. Weiser of New Ulm, members of the State Board of Medical Examiners, and Dr. J. T. Christison, President of the State Association.

Following the dinner members and guests adjourned to the rooms of the Tracy Clinic in the Masonic Temple. The meeting was called to order at eight o'clock by Dr. Ward Akester of Marshall, President of the society. Dr. Christison gave a short address on the value of organization. Dr. Johnson and Dr. Sogge spoke on Legislation, and both contrasted the present harmonious and prosperous condition of the State Association with that of a decade ago. Dr. Sherman and Dr. Weiser told of the activities of the State Medical Examining Board. Dr. Aldrich and Mr. White both stressed the value of the Legislative Committee in its relation to members of both Senate and House, especially in their ability and willingness to put facts before these bodies and enable them to correctly understand and evaluate the various bills under consideration and to realize that the medical profession was more concerned with the public health and welfare than with any selfish desire to profit by legislative enactment.

At this juncture Dr. Akester announced that adjournment would be taken to a larger meeting room where the Civic and Commerce Association of Tracy was in session. Mr. Brist was here called upon and gave a most illuminating address upon "Quacks and Their Methods," citing several flagrant cases recently brought into court in which fines and imprisonment were imposed, some suspended on promise of the offender to leave the state and others given jail sentences. This address was largely educational and was thoroughly appreciated by the lay audience.

MINNESOTA SURGICAL SOCIETY

The first fall quarterly meeting of the newly organized Minnesota Surgical Society was held Saturday, Sept. 14, 1929.

Following a luncheon at the Kitchi Gammi club the surgeons met in the afternoon at St. Luke's hospital. The program follows: "Pre-operative and Post-operative Treatment of Prostatectomies," Dr. W. N. Graves; "Physiology of Spinal Anesthesia," Dr. R. J. Moe; "Fracture of Carpal Bones," Dr. Gordon MacRae; "Skull Fractures," Dr. P. S. Rudie, and "Post-operative Hypothyroidism," Dr. W. G. Gillespie.

The winter meeting will be held at Rochester, Minn., and the spring session at St. Paul, both of which conferences will be similar to the meeting held in Duluth.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

Dr. H. C. Cooney of Princeton, Minnesota, was elected president of the Northern Minnesota Medical Association at the meeting held in Bemidji, September 2 and 3. Dr. E. W. Johnson, Bemidji, was elected vice-president and Dr. O. O. Larson, Detroit Lakes, was re-elected secretary-treasurer.

The meeting had an attendance of approximately 150, including members and their families.

ERGOT PREPARATIONS OMITTED FROM N. N. R.: AN EXPLANATION

In the Journal of the American Medical Association, May 4, 1929, there was published a report by the Council on Pharmacy and Chemistry on certain preparations of ergot which were intended for hypodermic administration. This report stated that the preparations had been omitted from New and Non-official Remedies because they were essentially watery extracts of ergot and therefore contained little or none of the drug; because, with one exception, they were not assayed by any method which showed their alkaloid content; and that an examination had shown that they were practically devoid of the specific alkaloids. Inasmuch as there seems to be in certain quarters some misunderstanding of the action, the Council on Pharmacy and Chemistry points out that the reason for omitting these preparations are those stated in its report, and the Council emphasizes that no evidence was found to indicate that in any case there was adulteration, or that improper ergot had been used in the manufacture of these products. Nor was any preparation found to be unduly toxic. (Jour. A. M. A., September 7, 1929, p. 769.)

CONSULTATION BUREAU

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11 West Summit Avenue
Saint Paul, Minnesota

1. *Question.*—A spinster, 39 years of age, with a slight cardiac lesion and an earlier questionable lung tuberculosis, was operated on for fibroids of the uterus. Before the operation was done, she was given two radium treatments, the effect of which lasted about six months. The uterus, part of the tubes, and part of one ovary were removed. Following the operation, she developed paralysis of the ankles and feet. She was unable to lift her toes or feet. One month later, there was no feeling from the hips down and a sensation of coldness in the lower extremities. The left eyelid would not open easily, but could be opened with effort. She was unable to lift her knees. Three days later, feeling and motion had returned as far down as the upper third of the legs. She left the hospital fifteen days later, but she could not walk alone. She walked on the external surface of both feet. This part struck first and then she shifted to the weight bearing part. One week later, the second and third toes of the right foot could be elevated. Pin pricks can now be felt all over the right leg and foot. In the left foot, pin pricks are not felt on the posterior two-thirds of the plantar surface and on a narrow strip above the external malleolus. She can feel hot and cold everywhere. There has been a gradual improvement in the strength of the ankles, and she can now walk with low heels and crutches. Sphincters have always been normal. Urination was painful during the act and for about an hour before. Now urination is painful only at the end.

   Answer.—A diagnosis of probable hysteria is made. This is based on the irregular distribution of the findings and the pin pricks. Retention of hot and cold and absence of pin prick sensation is very unusual in any other condition than hysteria. If the Babinskis are absent, the diagnosis becomes more certain as it is practically impossible to mimic a Babinski.

   We are all aware of the danger in making this diagnosis, but if you will proceed on this assumption without telling the patient what you think is the real trouble and treat her with psychotherapy, it is safe to predict a good result.

2. *Question.*—If a child of so-called Christian Science parents should fracture an arm and the child decide that he did not want a physician and was allowed by the parents to go unattended will any insurance company pay indemnity either directly or through compensation channels?

   Answer.—Your statement about the possibility of payment through compensation channels suggests that the fracture may have occurred in the course of the child's employment and so is compensable under the Workmen's Compensation Act. In such a case, the liability of the insurer would depend on the terms of the Workmen's Compensation Act in force in the jurisdiction where the fracture occurred and no categorical answer can be given without knowing where the fracture occurred. As an example, the Workmen's Compensation Act of Wisconsin provides for Christian Science treatment in lieu of medical treatment at the option of the employee, but provides that the employer may relieve himself of any liability under that option by filing a written notice that he will not be subject to it. In California, an employee refused medical attention and obtained the services of a Christian Science practitioner. The industrial commission denied compensation for such portion of his permanent disability as was due to his failure to accept the recognized remedies for his injury.

   If the hypothetical claim of the insurance company arises not under a Workmen's Compensation Act, but under an accident insurance policy, the liability of the insurer would depend on the exact language of the policy. In the absence of the knowledge of the hypothetical policy, I cannot offer any suggestion as to the possible liability of the insurer.

3. *Question.*—I would like to receive information about Lepso, sold by the Lepso Company, 895 Island Avenue, Milwaukee, Wisconsin. It is a reputed cure for epilepsy, which sells for a rather fancy figure.

   Answer.—I am asking Dr. Arthur J. Cramp, Director, Bureau of Investigation, American Medical Association, to mail you a copy of the pamphlet entitled, "Epilepsy Cures and Treatments," which contains an account of the investigation of Lepso. Most of the epilepsy cures contain bromides and Lepso is not an exception.

4. *Question.*—Young man, aged 29, injured his back one year ago. Pain was not great, and he continued to work. Ten months after the injury, the pain, which had never completely left him, became very severe. *X*-ray examination of the back did not reveal any pathological change. Examination was repeated one month later, and the tenth dorsal vertebra was found to be markedly increased in density. There was a soft tissue tumor surrounding the involved segment. Patient grew progressively worse, and a laminectomy was done because of evidence of myelitis. The tumor, which was a rather firm, bluish mass, was partially removed. The pathological diagnosis of sarcoma has been made. What is the prognosis?

   Answer.—Some sarcomata are very sensitive to radiation. It would be advisable for you to give your patient a regular course of treatment. If the tumor has not invaded the spinal canal and cord, there is a possible chance for some return of function. The prognosis is not good because of the difficulty of completely removing tumors in this region and because of the tendency to recurrence.

OBITUARY

Liston Q. Greeley

1868–1929

Dr. Liston Q. Greeley, practicing physician in Duluth for the past thirty-two years, died suddenly at his home September 23, 1929, as the result of a relapse following a minor operation.

Educated at the Fergus Falls, Minn., high school, Dr. Greeley later attended the St. Cloud normal school and received his medical education and degree from the University of Minnesota in 1897. He came to Duluth in August of that year and began the practice of medicine with offices in the West End. He became widely known in the West End during his many years there. Several years ago he established offices down town.

Dr. Greeley was a member of St. Louis County Medical Society and the State and National Medical Associations.

Survivors are his wife, two daughters, Charlotte and Clara Mary; a son, Horace; two brothers, including Dr. H. W. Greeley, Rochester; and a sister, Mrs. Frederick Eames, Duluth.

John H. James

1846–1929

Dr. J. H. James, one of Mankato's oldest physicians, died September 19, 1929, of heart disease at the age of 83 years.

Dr. James, who was born in Greenwich, N. Y., and received his degree from New York university, was a member of the National, State, Southern Minnesota, and Blue Earth County Medical Associations, the American College of Surgeons and the American Ophthalmological and Otolaryngological Society.

His widow and a brother, Fred James of Rochester, survive.

Arthur W. Whitney

1864–1929

Dr. Arthur W. Whitney died September 14, 1929, after having suffered from poor health for two years. He was born in Ontario and graduated from Queens college, Kingston, Ontario. His post-graduate work was done at Northwestern, Johns Hopkins and Harvard universities.

Dr. Whitney began his medical practice in St. Paul, 33 years ago, and since then had lived theire continuously.

Survivors are his widow, Clara; a daughter, Mrs. Joseph M. Taylor, Minneapolis; a sister, Miss Anna Whitney, who is a teacher in the public schools; and three brothers, Edmund and George, St. Paul, and Wilfred, Toronto.

COMMUNICATION

To the Secretary,
Minnesota State Medical Association

Dear Doctor:

You and the members of your association are most cordially invited to attend the next annual meeting of the Southern Medical Association which will be held in Miami, November 19 to 22. Our Association is making every effort to make this the outstanding meeting of the Southern Medical Association. The scientific program, with its twenty Sections, will insure a most diversified and interesting meeting. The clinics to be presented by the Dade County Medical Society will afford an excellent demonstration of the practical phases of medicine and surgery.

The sunshine and optimism of Florida will be injected into a well-arranged entertainment program. Golfing, boating, swimming, fishing and trap-shooting will be here for you. Miami and Miami Beach are amid the tropical setting of the show places of this great nation. At this season of the year, they are particularly beautiful, as are other sections of Florida. The members of your Association will be afforded the opportunity of not only attending the best meeting the Southern Medical Association has ever held, but also of visiting our beautiful state to which thousands of tourists make an annual pilgrimage.

It is a privilege for the Florida Medical Association to entertain this great Association and we are desirous of having your members as our guests during the coming meeting of the Southern Medical Association. May I ask that you give this meeting editorial space in the coming issue of your Journal.

Thanking you for your coöperation and looking forward to greeting you personally in Miami in November, I am

Most cordially yours,

Shaler Richardson, M.D.,
Secy.-Treas.-Editor.

MUM—NONSPI—ODORONO

In 1914, Mum was found to contain essentially zinc oxide and benzoic acid in a fatty base. In 1915, it was reported to contain salicylic acid, zinc oxide, glycerin, water, a tallow-like fat and traces of essential oils. Later the A. M. A. Chemical Laboratory found the product to contain 3 per cent benzoic acid and not salicylic acid. According to information available, the base of Nonspi is aluminum chloride dissolved in water containing some potassium and iron. In 1915, Odorono was found by the A. M. A. Chemical Laboratory to contain a 33 per cent solution of hydrous aluminum chloride. (Jour. A. M. A., September 28, 1929, p. 1012.)

OF GENERAL INTEREST

Dr. and Mrs. F. G. Benn have returned from a summer's sojourn in Europe.

Dr. and Mrs. Frederick H. K. Schaaf of Minneapolis have returned following a trip of several months abroad.

Dr. and Mrs. W. A. Fansler with their daughter, Miss Jane Fansler, have returned from a summer's stay in Europe.

Dr. Albert Allemann, former editor of the Medical Interpreter, wishes it known that he resigned as editor of the journal in December, 1928.

Although there has been no formal opening as yet, the Moose Lake hospital, at Moose Lake, Minnesota, recently completed, is now in use.

A recent report from the State Board of Health states that typhoid fever today is so rare in Minnesota that many medical students never have an opportunity of seeing a single case of the disease.

Members of the St. Louis County Medical Society at their annual banquet in Duluth, October 10, paid tribute to Dr. D. D. Murray and Dr. C. J. Braden, senior members of the society and pioneer medical practitioners in Duluth.

Dr. E. L. Gardner of Minneapolis has been appointed a member of the Editorial and Publishing Committee of Minnesota Medicine to fill the unexpired term of Dr. Adair, who has recently become associated with the University of Chicago. Dr. Adair took up his new duties in Chicago the first of October.

Dr. S. H. Boyer of Duluth, member of the State Board of Health, has been named by Governor Christianson to serve on an advisory commission to represent Minnesota in bringing about a better coöperation between state agencies with the Federal departments devoted to supervising and aiding Indian residents of the state.

Dr. L. P. Culver is associated with Drs. Larson, Wheeler and Wold in the practice of eye, ear, nose and throat diseases at 1027 Lowry Medical Arts Building, Saint Paul. After practicing in Stillwater, Dr. Culver took postgraduate work in his specialty for four months in Boston, and spent a year, for the most part, in Vienna.

Dr. A. J. Chesley of St. Paul, secretary and executive officer of the Minnesota department of health, was elected president of the American Public Health Association at its annual convention recently held in Minneapolis. He succeeds George W. Fuller of New York City. Dr. F. E. Harrington, Minneapolis commissioner of health, was elected third vice president.

The Northwestern Health Journal, which began as a small pamphlet several years ago devoted mainly to the activities of the Minnesota Public Health Association, has rapidly become a lay health journal of some importance with a rather widespread circulation. Its name, therefore, beginning with the October issue, has been changed to "Everybody's Health." The journal is particularly adapted to the physician's reception room.

Dr. Robert L. Sanders, Memphis, Tenn., was elected president of the Association of Resident and ex-Resident Physicians of The Mayo Clinic and Mayo Foundation at the eleventh annual reunion at Rochester in October. He succeeds Dr. G. J. Thomas of Minneapolis. Vice presidents elected are Dr. James Scarborough, Little Rock, Ark., and Dr. Carl R. Steinke, Akron, Ohio. Dr. John S. Abbott was re-elected secretary.

Dr. H. W. Christianson has sold his practice at Wykoff, Minnesota, to Dr. R. H. Beiswanger of South Saint Paul. Dr. Christianson has been located at Wykoff for the past eight years and is taking a fellowship in Proctology at the Mayo Clinic. Dr. R. H. Beiswanger is a recent graduate of the University of Minnesota and had been engaged in first aid work with an industrial plant in Saint Paul before locating in Wykoff.

Dr. W. E. Sistrunk left The Mayo Clinic, Rochester, August 31, to engage in the practice of surgery at Dallas, Texas. Dr. Sistrunk received his Ph.D. in 1900 from the Alabama Polytechnic Institute and his M.D. degree from Tulane University in 1906. In 1911 he joined The Mayo Clinic as assistant in pathology and began his surgical work in 1912. Before his departure a farewell dinner was given in honor of Dr. Sistrunk by a group of his colleagues.

The eleventh decennial Pharmacopeial Convention has been called for May 13, 1930, at Washington, D. C. We have been requested to announce that a questionnaire containing a list of products published in the eighth and ninth pharmacopeia but omitted in the tenth revision has been prepared and will be sent to any physician or druggist interested. It is the desire of the Committee on Revision to learn what demand there is for these omitted articles. From a cursory review of the list it would seem that their omission was advisable.

Tuberculosis Postgraduate Courses

Advance registrations for the series of seven tuberculosis postgraduate courses for physicians to be held under the auspices of the Minnesota State Medical Association, Minnesota sanatoria, and the Minnesota Public Health Association indicate intense interest on the part of the physicians. The series started October 24 at Pokegema Sanatorium, Pine City. These short courses, which are free to physicians, are made possible through Christmas Seal funds.

The schedule for subsequent courses follows: Fair Oaks Sanatorium, Wadena, October 29; Sand Beach Sanatorium, Lake Park, October 30; Sunnyrest Sanatorium, Crookston, October 31; Southwestern Minnesota Sanatorium, Worthington, November 8; State Sanatorium, Walker, November 13, and Glen Lake Sanatorium (Hennepin County) near Hopkins, November 15. Physicians interested in any of these courses may obtain full details by addressing the Minnesota Public Health Association, 11 West Summit Avenue, Saint Paul.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council of Pharmacy and Chemistry:

ABBOTT LABORATORIES
Metaphen 2500

HOLLISTER-STIER LABORATORIES
Bacillus Acidophilus Culture-Hollister-Stier
Acne Vaccine
Pertussis Bacillus Vaccine
Typhoid-Paratyphoid Prophylactic
Staphylococcic Vaccine

MEAD JOHNSON & CO.
Sobee

SANDOZ CHEMICAL WORKS, INC.
Calcium Gluconate-Sandoz

E. R. SQUIBB & SONS
Diphtheria Toxoid-Squibb, 30 c.c. vial

TRUTH ABOUT MEDICINES

Ointment Ephedrine Compound.—An ointment containing ephedrine-Lilly (New and Non-official Remedies, 1929, p. 166), 1 Gm.; menthol, 0.65 Gm.; camphor, 0.65 Gm.; oil of thyme, 0.0375 Gm.; hydrous wool fat, 5 Gm.; liquid petrolatum, 24 Gm.; white petrolatum, to make 100 Gm. Eli Lilly & Co., Indianapolis.

Lilly's Ephedrine Jelly.—It is composed of ephedrine sulphate-Lilly (New and Non-official Remedies, 1929, p. 169), 1 Gm.; glycerin, 15 Gm.; tragacanth, 1.5 Gm.; eucalyptol, 0.1 Gm.; oil of wintergreen, 0.005 Gm.; oil of dwarf pine needles, 0.005 Gm.; water to make 100 Gm. Eli Lilly & Co., Indianapolis.

Vioform-Ciba—Iodochlorhydroxyquinolin.—A substitution compound of anachlor-ortho-hydroxy-quinoline resulting from the introduction of one atom of iodine. Vioform-Ciba is used as an odorless substitute for iodoform. It is used as a dusting powder for application to wounds, ulcers, burns, exudative skin eruptions, etc. Ciba Co., Inc., New York.

I-X Barium Meal.—A mixture of barium sulphate U.S.P., 85 per cent; native aluminum silicate, 10 per cent; malted milk (malt extract-milk powder), 5 per cent; with a trace of saccharin. The preparation is used for roentgen-ray examinations, administered orally or by rectum. Dick *X*-ray Co., St. Louis.

Mead's Powdered Lactic Acid Milk Noncurdling, No. 1 With Dextri-Maltose.—A modified milk product prepared by adding lactic acid, U.S.P., and a maltose-dextrin preparation to whole milk, heating, drying, and powdering. It is proposed for use in the feeding of infants when it is desired to prescribe an acidulated milk with a certain amount of added carbohydrate. Mead Johnson & Co., Evansville, Ind. (Jour. A. M. A., September 7, 1929, p. 769.)

Sobee.—A mixture of soy bean flour 67.5 per cent and barley flour 9.5 per cent, to which has been added olive oil 19.0 per cent, sodium chloride 1.3 per cent, and calcium carbonate 2.7 per cent. Sobee is used as a substitute in the diet of infants who are sensitive to the proteins of milk. Mead Johnson & Co., Evansville, Ind. (Jour. A. M. A., September 28, 1929, p. 989.)

Cod Liver Oil with Viosterol 5 D.—Viosterol dissolved in cod liver oil, the solution containing not less than 400 vitamin A units per Gm. when tested by the pharmacopeial method and 66.65 rat units of vitamin D per Gm., this antirachitic strength being five times that of a potent cod liver oil used as a standard. This product is proposed for use in conditions in which it is desired to supplement the administration of vitamin A with that of vitamin D. For infants and young children the dose is 2.5 to 3.3 c.c. (53 to 67 minims) daily.

Abbott's Viosterol Cod Liver Oil.—A brand of cod liver oil with viosterol 5 D, N. N. R. Abbott Laboratories, North Chicago, Ill.

MISCELLANEOUS

STATE BOARD OF MEDICAL EXAMINERS

Oscar Von Shoppelrei (alias Dr. Von Schoppelrei) sentenced to two years in prison.—On October 11, 1929, before the Honorable Matthias Baldwin, Judge of the District Court for Hennepin County, Minnesota, Oscar Von Schoppelrei, who is not a medical man, but who claimed to a doctor, entered a plea of guilty to the crime of abortion and was sentenced by the Court to two years at hard labor in the State Penitentiary at Stillwater. Von Schoppelrei ran afoul of the law a year ago by sending health certificates to the State Board of Barber Examiners for applicants attending one of the barber colleges in Minneapolis. At that time, through the intercession of the State Board of Medical Examiners, his services were dispensed with and he dropped out of sight for the time being. He again resumed his activities along a different line, however, with the above result. A woman confederate of Von Schoppelrei's was sentenced, at the same time, to two years in the State Reformatory at Shakopee.

State of Minnesota vs. George Garoponlo (alias Dr. George).—The defendant, claiming to be a doctor, was arrested July 2, 1929, on a complaint signed by Mr. Brist, on behalf of the State Board of Medical Examiners, charged with violating the 1927 Basic Science Law, in that he attempted to diagnose and treat an ailment that he called syphilis, which in reality was simply a minor skin disturbance that cleared up in three or four days under proper medical attention. Upon being brought into court, the defendant entered a plea of not guilty. His bail was set at $1,500.00, and upon the preliminary hearing, held September 23, he was bound over to the District Court with bail in the same amount. October 7, 1929, before Honorable J. C. Michael, Judge of the District Court, St. Paul, Minnesota, the defendant entered a plea of guilty and was fined $250.00 or 60 days in the workhouse. The fine was paid and the defendant discharged from custody.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of September 25, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, September 25, 1929, having been postponed two weeks. Dinner was served at 7 p. m. and the meeting was called to order at 8 p. m. by the President, Dr. C. N. McCloud. There were 33 members present.

Minutes of the May meeting were read and approved.

The scientific program consisted of the following:

Dr. Rae T. LaVake (Minneapolis) read his Thesis, entitled "The Rectal Examination and the Concealed Second Stage of Labor."

DISCUSSION

Dr. J. L. Rothrock (St. Paul): I have been much interested in this condition which Dr. LaVake described and was glad to note that he gave us a little bit of the relative merits of the vaginal and rectal examinations. It seems to me that as the rectal examination has been brought to the front it has been productive of one thing, and that is the fact that, owing to its safety and the ease with which it is done, it has overshadowed the abdominal palpation, which, in my estimate, is superior to either the vaginal or rectal examination. By it we can find out many things; we can tell many times whether there is malposition. In the early stages by the rectal examination as well as by the vaginal examination it is impossible to diagnosticate the position. I personally do not hesitate to make a vaginal examination and, with proper protection, do not believe that the vaginal examination is a great danger. I insist on proper preparation and a very thorough technic, which, I regret to say, a great many practitioners have not acquired. They forget the fact that the bacterial flora on the inside of the labia is the same as on the skin and unless they are cleansed and great care taken there is great danger of carrying infection from the labia inside. I don't wonder they get infection.

With regard to this condition which Dr. LaVake has described, I have not observed it. I observe one cardinal rule in obstetrics—if the patient has good pains and the head does not descend well, I do not hesitate to ascertain why. I take the patient into the examining room and prepare for delivery. If there is a disproportion in the size of the head and pelvis, the head does not readily engage; if the head is soft and movable you can make allowance that it will mould and may engage. In the early stage you can then select and carry out your proper procedure; if it is going to be an instrumental delivery, then a further trial of labor; if not, then an immediate cesarean section. It has been a very great help to me since I adopted that plan. I want to add that I make as few examinations as possible. I utilize the rectal examination to ascertain the progress of dilatation of the cervix. If I want to find out whether there is disproportion, it is always by a vaginal examination and then always under an anesthetic.

Dr. J. F. Hammond (St. Paul): This is a rather interesting discussion regarding the relative merits of the vaginal and rectal examinations. I think as a rule in any procedure the simplest method is preferable and certainly the rectal examination is the simpler method of getting the information. In a great many cases, as Dr. Rothrock stated, it is possible to get all the information required by abdominal palpation and, with the additional information gained by doing a rectal, I think that is all that is necessary. There are cases though when one feels all the necessary information has not been obtained and then I think one should not hesitate to do a vagnial under proper precautions. As a matter of fact the preparation for a vaginal examination is often inadequate. The only wonder I have is that in many cases there are not more infections owing to the way the examinations are done. The nurse may make a very elaborate preparation and the doctor will come along with possibly sterile gloves and introduce the gloved finger through the vulva not prepared at all. The patient in that way is submitted to the possibility of infection. On the other hand, I think students are now instructed that they can get all the information necessary from the rectal examination. Just the other day in the hospital an intern told me there was three-fingers' breadth dilatation in a patient under observation. He had made a rectal examination. I made a vaginal and decided to send the patient home. There was no dilatation. I also had made a rectal but could not be sure. I have frequently heard doctors say that the rectal examination is absolutely useless. That is wrong. A great deal of information can be obtained in this way but the attendant must realize it is not sufficient in some cases.

Regarding this concealed second stage, I have not recognized that so much. The mistake usually made is that one feels that the cervix is completely dilated when it is not and it is necessary in a good many cases to make a thorough and proper vaginal examination.

Dr. H. B. Sweetser (Minneapolis): I have been very much interested in the discussion of the care with which asepsis is arrived at. I would like to ask if you know the difference in the mortality and morbidity rates today and say thirty or forty years ago? It is assumed from what I have just listened to that most women are delivered in the hospital under the most rigid aseptic care. Thirty or forty years ago we never delivered a patient in a hospital and we had no trained nurses, and we had very little aseptic technic as it is looked upon today. And I am wondering how much difference there is in the mortality and morbidity rates of then and now.

I was Assistant City Physician about 1890 and delivered a lot of the poor women of the city. Frequently I would go to a poor family and about the only preparation provided would be clean sheets to put on the bed after the baby was born. As I remember it, there was very little mortality or morbidity, and I have often wondered whether the number of women now delivered in the hospital will not show a higher rate of both than

at that time. If this is so, and I am led to suspect that it is so, from a survey of the literature of recent years, the cause lies probably in some measure in the grouping of many women together. Therefore, in addition to the aseptic care so well outlined by Dr. La Vake, equal care should be exercised by the hospital management in excluding from the obstetrical wards all possible sources of infection.

DR. LAVAKE: I thought this would be of interest to you because at present the rectal examination is being taught in many schools. Unless the student is taught, as Dr. Rothrock says, that when he is clearly in doubt he had better check up by a vaginal examination, that man may allow the patient to go on until a serious condition exists. Dr. Rothrock is absolutely right in stating that not enough care is taken with the abdominal examination. Research substantiates his statement that the bacteria around the introitus are the same as on the skin. Dr. Sweetser asks, "Do we have more or less sepsis than we used to have?" Apparently we have not improved in this respect. We know that the United States is about the thirteenth on the list; it is almost the worst country in the world in regard to puerperal sepsis. I quoted figures from the Sloan Hospital for Women in New York, showing that the use of sterile rubber gloves reduced the incidence of sepsis from 1.13 to 0.61 per cent. Improvements in technic should have reduced the incidence of sepsis markedly, it would seem.

I do not believe that the women of today are weaker than they used to be, but we have conditions in the city now that are not analogous to those Dr. Sweetser had. In those days a woman was delivered in her own home, in which she had usually lived for many years and had become immune to the bacteria surrounding her. Today women are not so isolated. There are more opportunities for them to be in surroundings containing bacteria to which they are not immune. They move around from apartment to apartment, etc.

In this regard, unless a hospital is equipped with separate obstetrical and surgical wards and is so arranged that there can be no contact between obstetrical cases and a case of infection, that hospital is not a safe place for a maternity case. Dr. Watson and his coworkers at Sloan Hospital for Women did a most remarkable piece of research work in which they pointed out the fact that many infections are apparently projected from the nose and throat of attendants. Attendants should be masked as at surgical operations. In the Minneapolis General Hospital we have had to close down the Obstetrical Ward many times in the last fifteen years because of infections. Although we were not able to trace the source of infections absolutely, the presence of respiratory and general infections throughout the city was significant.

I feel that staying out of the vagina, when possible, is expedient. It is not everything, of course. Cesarean section statistics point to the danger of vaginal examinations. If you stay out of the vagina and do a cesarean section before labor begins, the expert can expect a mortality of about one per cent. A six-hour trial of labor will increase this to about two per cent.

In my opinion, one of the reasons we have not reduced our mortality is that students are taught so many ways of interfering and see such brilliant results of interference, but fail to realize the care that is exercised in choosing the case for interference and the care that is used in carrying out the aseptic technic. The result is that they interfere more frequently then they used to and, thus, improved methods of technic have been counterbalanced by increased unnecessary interference, with no improvement in results.

DR. HAMMOND: Regarding the question of visitors entering the maternity ward, Dr. LaVake has stressed the importance of attendants being masked in obstetrical cases. In this locality, or in St. Paul, two years ago we felt it would be a good thing to introduce a rule which is quite customary in a good many eastern hospitals, of excluding visitors as much as possible, particularly children. In this particular hospital we excluded all under 14 years. You can go up in the ward any day or evening during visiting hours and find two or three children lolling around on a bed. We introduced this rule and were surprised to find that some of our attending men were very much opposed to it. I would like to ask Dr. LaVake if that has been tried in Minneapolis? This procedure is taken as a matter of course in the East.

DR. ROTHROCK: I think that perhaps during the seasons when there are a great many respiratory infections that might be a very good thing to do. It is a potential source of danger certainly.

One other thing interested me. I started to practise obstetrics when everything was done in the home except cesarean section, yet it was comparatively rare that we saw a serious case of infection and I remember very well some twenty years ago when patients began to be sent to hospitals, it was not very long until I had half a dozen quite serious cases of infection in the hospital. Then the patients were scattered around in the hospital. I soon learned that the patient was probably safer if delivered at home and that if we wanted to avoid disaster in the hospital we must furnish our patients extraordinary protection. Soon hospitals set aside part of the building for obstetrical work exclusively. I believe that under such conditions you can get along pretty free from infection. One thing is important, *i.e.,* should a patient start to have a temperature, that patient should be immediately isolated until you know whether or not she has a serious infection.

DR. LAVAKE: From the pediatric standpoint, it is important to consider the question of visitors in the hospital. In time past we had several deaths of newborns which we thought could be directly traced to infections brought in by visitors. Since then we have made it a rule that children and all other visitors should be excluded from the mother's room while the baby is present. To my knowledge, we have never had a mother infected by a visitor. The mother can be careful not to allow a visitor to get near her. In the framing of rules, one must be practical. Few women would go into a hospital where no visitors are allowed and where they could not see their children.

Many men consider much of this talk concerning infections by the vaginal examination and the substitution

of the rectal examination as idle. To them refinement of technic is the crux of the matter. Care in technic is the major factor in the safety of a vaginal examination. There is no question about that. However, one cannot as surely render aseptic the vulva, the vagina, and cervix in labor as he can the abdominal wall in a gynecological examination and I feel that a peritoneum, barring trauma, will take care of pyogenic organisms better than will the genital tract lacerated by labor, especially the cervix. So, from the standpoint of an infection, we should approach labor with as much care as we do a major gynecological operation, as regards aseptic technic. The rectal examination I believe to be a step in advance in this regard.

Dr. E. M. Jones (St. Paul) reported two cases of osteomyelitis. Numerous lantern slides were shown.

DISCUSSION

Dr. Owen Parker (Ely): I was very much interested in Dr. Jones' case reports of osteomyelitis. Osteomyelitis is a large and interesting subject. We do not see a great many cases of acute osteomyelitis in our industrial mining community, although they occur most often in children and we have a school population of 2,500. Many of our cases are of traumatic origin as in some of the bad compound fractures, and in severe gunshot wounds. These are difficult cases to handle and give one much trouble. Most of the osteomyelitis cases due to gunshot wounds where there is a great comminution and infection of bone, are of long duration. I have in mind three cases, all occurring within the last three years and all of whom were infected and all of whom still have some trouble from osteomyelitis; one a severe gunshot wound of the upper end of the femur through the intertrochanteric region who also developed symptoms of tetanus and was given large doses of tetanus antitoxin intravenously; second, a gunshot wound shattering the ilium and injuring the lumbar spine; and third, a bullet wound fracturing the ilium and spinous process and lamina of the lower lumbar spine and injuring the cord slightly.

In acute cases, if one can operate early as he does in appendicitis one would save the patient and himself much trouble but not always. If they lapse into the subacute and chronic cases and go on to sequestrum formation and discharging sinuses, many operations are usually done before a final cure is obtained.

I recall one case of a lumberman quite a number of years ago who came to me with an old osteomyelitis of the tibia. He had previously been operated on several times and I operated on him at least three times, removing altogether a large part of the tibia and finally obtaining a complete healing of the bone with excellent function. He had been having trouble over a period of ten years. He is still doing hard work and has had no recurrence.

In the early diagnosis *x*-rays should be taken although they do not help us much except in a negative way. In the old chronic cases, of course, they are of greatest assistance in diagnosis. One has to be careful not to mistake the acute cases for arthritis or acute rheumatism, especially when they occur near joints. This, of course, is an old warning occurring in the textbooks when we were students, but still seems to require mention. The relationship of osteomyelitis and trauma is an interesting one and of medico-legal importance, as was recently brought forcibly to my attention by a case of ours which was tried before the Industrial Commission.

Osteomyelitis is a large and interesting subject and I wish to compliment Dr. Jones on the presentation of these cases.

Dr. J. L. Rothrock (St. Paul) reported the following "Unusual Case of Toxemia of Pregnancy."

Mrs. A., age 33, mother of three children and now about eight months advanced in her fourth pregnancy, was admitted to the Miller Hospital December 30, 1928, at 11 a. m., giving the following history:

Patient, the wife of a farmer, had, so far as is known, been well up to Christmas eve, when she went to a midnight church entertainment and the next day was taken with what was supposed to be an attack of influenza. She was first seen by her doctor on Thursday, the 27th; was at that time vomiting and gave a history of having vomited everything she took from the onset of her illness. She was not seen again until Saturday, the 29th, when her condition was found to be unchanged; the vomiting continued and it was then arranged to bring her to the hospital Sunday.

Examination on admission to the hospital disclosed the following symptoms: The extremities were cold, the skin suffused, the pulse rapid, 120, weak and scarcely countable at the wrist. Her mental condition was clear; said she felt well except for nausea, and was vomiting everything she took. She had a slight cough and on examination was found to have some râles in the larger bronchial tubes, indicating a slight bronchitis. Although she had taken cathartics there had been no bowel movement since the onset of her illness. She complained of no pain.

Examination showed her about eight months advanced in pregnancy but she had not felt motion the last two days and on careful examination fetal heart sounds could not be heard. Her doctor reported that he did not hear them at his first visit on Thursday and assumed that the fetus was probably dead. There was no distention or indication of obstructon of the bowels. There was no uremic odor of the breath. When awake she was unusually alert but slept most of the time, but on awaking showed no mental confusion.

On the morning of December 31, it was reported that she had passed no urine. On catheterization about 50 c.c. were obtained. This was very highly colored and contained only a trace of albumin but a few granular and hyaline casts. The patient still continued to vomit. She was passing at the rate of about 50 c.c. of dark colored urine in 24 hours.

January 1, 1929, vomiting still continues frequently. Vomitus is brown in color and small in amount, sometimes watery. About 3 p. m. the patient began to have pains and indication that she was falling in labor. At 8 p. m., the cervix being fully dilated, in order to conserve her strength, low forceps were applied and she was delivered of a stillborn macerated fetus. Vomiting

continued during the night. Patient catheterized and only 100 c.c. of urine obtained, notwithstanding copious hypodermoclysis, intravenous injection of glucose solution and proctoclysis.

January 2, vomiting continues, even though everything—fluids and food—have been withheld from time of admission to the hospital. During the day the patient was catheterized and 255 c.c. of urine obtained.

January 3, at 1:30 a. m., 525 c.c. of urine obtained by catheterization, at 5 a. m. 360 c.c., and at 7 a. m. the patient voluntarily passed 300 c.c. Patient still continues to vomit, and is becoming restless and fretful. Respirations are much labored. The patient is now wakeful and does not sleep.

January 4, the urine continued to increase in amount, passed voluntarily, vomiting is less and she begins to retain liquids. Is restless and at times slightly irrational. Temperature from date of admission has remained normal. She is now expelling flatus and frequent liquid stools of a very foul odor.

Takes fluids freely. Restless and irrational. Stools involuntary and patient seems very weak. Still takes liquids but not so well—growing weaker.

January 6, a. m., condition much the same. Pulse is rapid and weak and irregular. The patient continues to cough and temperature began to rise.

January 7, temperature 104°, pulse 134, involuntary stools and urine. Respiration shallow and irregular, pulse very weak. Patient has a vacant stare with eyes wide open and cannot be aroused. Does not recognize those about her. Temperature continued high all day reaching 105°, and death took place at 3:16 p. m. January 8th. Temperature before death 106°.

From the history the dominant clinical symptom was hyperemesis and this persisted throughout the course of the illness until within two days of death. These symptoms occurring in a pregnant woman, it was recognized that we were probably dealing with a profound toxemia, with, no doubt, profound pathological changes in the liver so that acute yellow atrophy was thought of. The jaundice, however, was absent; there was no leucin or tyrosin in the urine, and no demonstrable decrease in the size of the liver could be determined. There were no convulsions; still the thought of an atypical eclampsia had to be considered. Under these conditions only a tentative diagnosis was possible before death.

Laboratory Findings. Urinalysis: sp. gr. varied from 1014 to 1023; albumin varied from a trace to a light cloud, never very much. No bile present. Microscopic findings: a few granular and hyaline casts. No leucin or tyrosin.

Blood pressure taken on several occasions, and always below normal. Blood chemistry showed 23.4 mgms. sugar, 3.95 creatinin, 88.4 urea nitrogen. The Van den Bergh test 3.75 mgms. bilirubin. Basal metabolism was 34 per cent, based on an estimated weight. Van Slyke 80 per cent, and P.S.P. 27.5 per cent in four hours, with no excretion the first hour.

Blood count: hemoglobin 78 per cent, erythrocytes 4,270,000, leukocytes 13,300, polymorphonuclears 78 per cent.

The clinical picture of toxic degeneration of the liver, whether with hyperemesis or atypical eclampsia, has many points in common. Frequently the entire clinical course is characterized by hyperemesis, so that for many cases of hyperemesis occurring during pregnancy it is correct to say that toxic degeneration of the liver is a characteristic finding in those cases that go on to fatal termination. According to Seitz, the more pronounced liver changes in pregnancy allow themselves, from a pathological and anatomical standpoint, to be sharply differentiated into three distinct forms:

(1) Toxic degeneration of the liver characterized by diffuse fatty degeneration of the liver cells, without necrosis, and without diminution in the size of the liver clinically, taking the form of hyperemesis or presenting the picture of a general intoxication. There is no jaundice and no leucin or tyrosin in the urine.

(2) Acute yellow atrophy of the liver characterized by a diffuse fatty degeneration of the liver cells with widespread necrosis and with shrinking of the volume to one-half its size or less. Clinically the dominant symptoms are frequently hyperemesis and jaundice and leucin and tyrosin are present in the urine.

(3) Eclampsia characterized by the presence in the liver of localized areas of cell degeneration and necrosis following thrombosis of the smallest interlobular vessels and peripheral capillaries. Clinically it presents a picture of eclampsia with or without convulsions; in other words, typical or atypical eclampsia. The anatomical changes found in the liver are characteristic and are found exclusively in patients dying of eclampsia. In this respect the liver of eclampsia differs from toxic degeneration of the liver and acute yellow atrophy as the same changes are sometimes found in men and non-pregnant women, so that they seem to bear no relation to pregnancy, as various forms of poisoning will give rise to similar lesions, notably phosphorus, chloroform, and chloral.

In the present case, the question arises if this patient had influenza, to what extent might the toxins of influenza (which we know is very fatal to pregnant women) have had to do with the toxic degeneration of the liver?

According to experience, this form of toxic degeneration of the liver is very fatal and by the time the symptoms are well established irreparable damage is done and the case is practically hopeless.

DISCUSSION

Dr. H. L. Ulrich (Minneapolis): More and more attention is being called to this type of case. We are getting more aware of them. We see them occasionally in the practice of Internal Medicine.

There are three types of acute liver insufficiency—the focal necrosis type of eclampsia, the acute yellow atrophy, and the acute fatty liver.

All the data on the blood are significant and could be induced by renal stoppage, intestinal obstruction, or liver insufficiency. The alkalosis no doubt was due to dehydration and dechlorination from hyperemesis. Since

clinically we can rule out intestinal obstruction and a renal insufficiency, the only other organ left is the liver.

We must be more acute in our analysis of these cases. We can differentiate the acute yellow atrophy from the eclamptic and fatty type. To differentiate the two latter is a more difficult task unless we use the criterion of convulsions. I see no reason why we can exclude convulsive seizures in any of these insufficiencies.

There is no laboratory method as yet devised to tell us what type of insufficiency we are dealing with. We are again thrown back on clinical methods. Even here the clinical end-result will only be of value in prognosis, which is usually fatal.

The meeting adjourned.

CARL B. DRAKE, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
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THOMAS A. PEPPARD,
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PATHOGENESIS OF PULMONARY TUBERCULOSIS AND ITS COMPLICATIONS: Aaron Aikin (Amer. Rev. of Tubcrc., August, 1929, Vol. XX, No. 2, p. 243). Attempts have been made to classify tuberculosis, based on pathology, on clinical findings and on *x*-rays.

In 1914 Nicoll differentiated chronic tuberculosis into exudative and productive forms. The *x*-ray can distinguish the above, yet it cannot show whether an exudative lesion has undergone caseous necrosis or is simply a congestive or gelatinous pneumonia. In fact, exudative and productive changes are frequently associated, and an exudative focus can be replaced by a productive fibrous nodule, or entirely disappear.

Graff and Kupferle have advanced *x*-ray knowledge to the point where one recognizes the indistinct border of exudative caseous foci with a dark center. Productive nodular foci produce separate, dense, sharply outlined shadows. These differentiations are of aid in diagnosis and prognosis.

Repeated *x*-ray studies are necessary for prognosis, as mistakes are common in single plates.

Neumann of Vienna has evolved a classification in three stages, based on the fact of the primary stage in childhood, characterized by a primary broncho-pneumonic focus, with lymphogenic propagation to the bronchial lymph nodes. The second stage is characterized by hematogenous metastases, in lungs or other organs. The third stage is the bronchogenic phthisis or isolated organic phthisis, spread by the bronchial passages.

The value of the differentiation of the latter two adult stages is the difference in prognosis.

The hematogenous form is usually benign. Even with advanced systemic evidences the disease may last decades.

The course in the tertiary stage is different. Death occurs almost invariably within eight years unless surgical interference is instituted early.

The primary stage is usually the result of aerogenic infection. The result is an area of broncho-pneumonia and is therefore an exudative lesion. It may undergo one of several changes:

1. Enlarge to occupy an entire lobe.
2. Calcify.
3. Disappear.
4. Become inactive, to show an acute exacerbation in later life.

Associated with the development of this primary focus is the involvement of the hilus nodes, with streaks or bands running from the primary focus. These nodes may caseate and slowly develop calcified areas. The primary complex may progress until the tubercle bacilli reaches the blood stream. A meningitis or a miliary tuberculosis than results.

The second stage is the period of hematogenous disseminations. This usually occurs about the age of puberty. There are various grades:

1. Malignant proliferation, usually in individuals with low resistance.
2. Virulent proliferation, characterized by many tubercles (4 types):
   (a) Typho-tuberculosis: This form usually shows surgical tuberculosis. Age incidence 13 to 18 years.
   (b) Polyserositis: Entrance through pulmonary artery, with resulting pleuritis. Polyserositis is often the result.
   (c) Diffuse fibroid tuberculosis. Scattered tubercles, chiefly apical and infra-clavicular—usually bilateral.
   (d) Dense fibroid tuberculosis: Bilateral induration of both apices from productive changes in hematogenous tubercles. Ulceration and stationary cavities may follow.
3. Gland proliferation. Benign form of pulmonary tuberculosis. Few foci in apices, usually bilateral.

The third stage begins as the incipient bronchogenic phthisis of adults. This is the type seen at puberty or following pregnancy. The onset is acute tuberculosis. Broncho-pneumonia follows usually, after rupture into

bronchus. Shadows in this type are usually lobar in distribution.

The author believes both edogenous and exogenous reinfection possible; occasionally simultaneous. Hence, efforts should be made to develop not only individual resistance but to provide against reinfection.

R. P. Buckley, M.D.

SURGERY

SUPERVISORS:

DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

ACUTE PANCREATITIS—AN ANALYSIS OF EIGHTY-EIGHT CASES WITH ESPECIAL REFERENCE TO DIAGNOSIS: Wm. Linder, M.D., and Louis J. Morse, M.D., Brooklyn, N. Y. (Ann. of Surg., Vol. XC, September, 1929). The authors reviewed a series of cases and believe that acute pancreatitis can be diagnosed before operation, because of the differentiating symptom-complex which it presents, in comparison to other acute upper abdominal conditions.

There have been many theories propounded and experiments performed to determine the etiology of acute pancreatitis and a few are here briefly given.

1. Pyemia, although early isolation of bacteria has never been accomplished.

2. By contiguity from gastric or duodenal ulcers, although no such pathological lesions were observed in this series.

3. Regurgitation of duodenal contents may produce acute pancreatitis, and, although this is probably a rare procedure, it has been experimentally produced by injecting enterokinase into the duct of Wirsung.

4. The fact that the lymphatics of the biliary tract and the pancreas are supposed to be closely connected has led Naaugeret, Ansperger, and Deaver to believe in lymphogenous extension.

5. Retrojection of bile into the pancreatic duct. Of the four types of papillæ of Vater possible embryologically, two will permit this condition. A biliary stone obstruction or a spasm of the sphincter of Oddi will cause an influx of bile in the pancreatic duct and cause acute pancreatitis, when the bile is infected, the proportion of salts increased or under increased pressure.

Acute pancreatitis is not a primary disease, but a sequela, and biliary disease is usually a forerunner. Egdall found biliary calculi in 50 per cent of his cases and 75 per cent complained of gall-bladder symptoms.

In their analysis, the authors have taken the presence of fat necrosis as their basis of diagnosis, although they mention that acute pancreatitis may occur with only the presence of acute pancreatic edema.

Females constituted 88 per cent of the cases.

Fifty per cent occurred in the fourth and fifth decades; the youngest was 19, and the oldest 70.

Fifty-three per cent gave a definite history of biliary disease, and all but 8 complained of dyspepsia.

Localized pancreatic irritation and toxemia are caused by activation of trypinogen into trypsin and the protein digestion by this enzyme with the liberation of lipase. The resulting edema of the pancreas causes biliary obstruction, and pain by stretching of the capsule. Hemorrhagic features are caused by digestion of blood vessels. And, lastly, the peritoneal inflammation results from the irritants of the catabolic process.

Symptomatology.—Pain is very severe and repeated doses of morphine fail to relieve it. Ninety-seven per cent had constant epigastric pain and other associated locations were: right hypochondriac, 67 per cent; left lumbar backache, 66 per cent; left hypochondriac, 41 per cent; and generalized abdominal, 19 per cent.

Vomiting was present in eighty-five cases. It is never progressive or fecal, and can usually be relieved by one gastric lavage.

Shock, collapse, cyanosis and dyspnea usually occur. Forty per cent were cyanotic and seventeen were in shock.

Temperature is of no value, but of interest is the temperature-pulse ratio, with the latter rising out of all proportion to the temperature elevation.

Jaundice was present in twenty-eight patients and never severe.

Peritonitis may be of a local or diffuse variety.

Constipation is the rule but not complete, as in intestinal obstruction.

Because of its similarity with other upper abdominal conditions, acute pancreatitis should be clearly differentiated.

Acute cholecystitis; palpable mass under the liver margin, thoracic breathing, and, in case of perforation with shock and peritonitis, a preëxisting gall-bladder history should make the diagnosis.

High acute intestinal obstruction; early visible peristalsis, progressive vomiting, painless abdomen and no epigastric tenderness (with radiation to the left), or lumbar pain.

Acute renal colic without radiation of pain; pyuria.

Torsion of a ptotic kidney; history of ptosis in a patient with considerable weight loss and a sudden physical exertion. Kidney is palpable.

Acute hematogenous infection of the kidney; antecedent history of focal infection, with sudden chill, rise in temperature, and lumbar tenderness or spasticity.

Perforated gastric or duodenal ulcer; ulcer history, board-like rigidity, scaphoid abdomen, early general peritonitis, gas in peritoneal cavity, and expiratory grunt.

Operative findings and treatment.

Fat necrosis, 100 per cent; gall-bladder disease, 84 per cent; biliary calculi, 61 per cent; serosanguineous exudate, 59 per cent; granular omentum, 43 per cent.

The immediate treatment is to open the pancreatic capsule and relieve pressure, and, if the condition of the patient warrants, do a cholecystectomy to remove the source of infection.

The mortality rate was 26 per cent and the authors believe that proper early treatment of gall-bladder

disease will reduce the mortality rate of acute pancreatitis.

L. C. Thomas, M.D.

PEDIATRICS

SUPERVISORS:

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RESEARCH IN CONNECTION WITH ACUTE POLIOMYELITIS: A. E. Vipond, M.D., Montreal (Arch. of Ped., August, 1929, Vol. XLVI, No. 8). In the Lancet for January 7, 1928, appeared a very interesting article on acute poliomyelitis by Dr. Kinnear Wilson. He believes that patients who suffer from this disease should be isolated, also that the sole specific treatment consists in intraspinous injection of immune serum, a method which has been used with moderate success.

The blood serum, taken from patients who have had this disease and injected in others, seems to produce immunity, the same as obtains in scarlet fever.

The author has a method of his own in the treatment of poliomyelitis. He collects the urine early in his cases. A little catheterized urine is allowed to fall into a blood serum tube and placed in the incubator. Streptococcal strings were found in every instance where he took a catheterized specimen. From this a vaccine was made.

In one case, on August 15, about 1 c.c. of the vaccine, which equals 500,000,000 streptococci was used. August 16, the sole reflex was present. August 17, the child could stand on both legs. August 18, he could walk. He was given four inoculations in all, 1 to 2 days apart. In all cases in which vaccine was used early, remarkable results were obtained.

Professor Wray of McGill University pointed out how degenerative changes took place at an early date in the spinal cord. He states that degenerative changes take place in three days from the onset of the disease. We cannot expect that cases which recover spontaneously, or as the result of treatment, have suffered from much, if any, degenerative changes in the spinal cord. He is fully convinced that up to the third day and even in some, up to the tenth day that many degenerative changes may have taken place. The early condition is an irritation of the anterior cells of the cord followed by hyperemia and by hemorrhage into the cord at the anterior portion.

In every instance where the treatment began in the early stage of the disease, a perfect recovery took place. Even 10 days from the onset of the trouble treatment should be vigorously carried out in the hope that degenerative changes had not taken place, or that the change may not be beyond recovery.

R. N. Andrews, M.D.

SOME OBSERVATIONS OF THE RESULTS FOLLOWING THE USE OF DRY MILK IN INFANT FEEDING EXTENDING OVER A PERIOD OF TEN YEARS: M. M. McCord, M.D., Rome, Ga. (Arch. of Ped., September, 1929, Vol. XLVI, No. 9). Bonnamour found that dry milk was extremely useful and especially valuable in cases of sickly infants, who, while unable to digest milk in other forms, yet could take dry milk readily and make good progress.

Naish says: "I have followed up a considerable number of infants fed on dried milk and I am personally convinced that there is no more risk of rickets with this diet than with a good quality of raw cow's milk."

Millard states: "Dry milk had one most important advantage—greater digestibility. Many infants would retain it and at once begin to thrive who had previously been continuously subject to vomiting after each feeding, and in consequence were making little or no progress."

Hill says: "Dried milk undoubtedly has a place in infant feeding. It has come to stay and while I by no means agree with those who would use it in the majority of their difficult feeding cases, there is no question that it sometimes works remarkably well."

Klein published a report of experiments in which tuberculous milk dried by the Eckenberg roller process was used. Guinea pigs inoculated with the infected fluid milk showed definite tuberculous lesions after twenty-one days, whereas those inoculated with the dried product did not show these lesions on postmortem examination after the same period.

Hart, Steenbock, and Ellis say: "Probably with all milk powders, irrespective of method of manufacture, the safest procedure is a restricted dietary, particularly in infant feeding, and to supplement them with some potent source of antiscorbutic vitamin." A possible exception to this statement would apply to the powders made by the Just or roller process from the summer produced milks where the cows are made rich in the antiscorbutic vitamin by the proper selection of roots and tubers.

Mackay and Shaw find that rapid healing of bone lesions in children can be brought about by the use of dry milk irradiated with the ultra-violet light from the mercury arc. Dry milk is evidently more soluble and more digestible than liquid milk. Therefore in the case of a 12 per cent dry milk, made by the Just roller method, the infant gets all the fats in contrast to milk much higher in fats where much of it is not utilized by the infant.

The great danger of liquid milk, especially in the summer months, is contamination of it with dangerous bacteria, which cannot always be recognized until the danger is done. Drying milk by the Just roller process evidently destroys all dangerous organisms without destroying the value of the milk as a food.

R. N. Andrews, M.D.

ROENTGENOLOGY

SUPERVISORS

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CONGENITAL BONE SYPHILIS: E. P. Pendergrass, M.D., and R. S. Bromer, M.D. (Am. Jour. Roent. July, 1929, Vol. XXII, No. 1, pp. 1-21). The authors first review the two methods of ossification of bone, endochondral and intramembranous. The diaphyso-epiphyseal junction (epiphyseal line) is a narrow, unbroken dense line and corresponds to the limit of advancing ossification. It is very important because of the changes which occur there in rickets, scurvy, congenital syphilis and acute leukemia. Congenital syphilis may manifest itself as an osteochondritis, the most common form, or as a diaphysitis or a periostitis. One or all of these conditions may be found in the same patient.

It has been recognized that bone lesions are associated frequently with congenital syphilis and may be the only evidence of the disease. Osteochondritis may be divided into three stages. Periostitis and diaphysitis usually accompany the third stage of osteochondritis, or they may occur individually as the only evidence of the infection but this is relatively rare. Periostitis is rarely seen in the still born; more often it occurs in the older infant, that is, an active child.

Congenital syphilis of the bones is not a general systemic infection but is due to the local presence of the spirochetes or their toxins. It may involve one or all the bones of the body so that an examination should not be regarded as negative until the entire skeleton has been examined. The point of election for the lesions is in the bones of more active normal growth; these being the lower end of the femur, lower end of radius, upper end of tibia, and upper end of femur in the order named.

The authors point out a new roentgenological sign, epiphysitis, which has hitherto not been described, and the description is based on a study of their own cases. It is divided into three stages and discussed with osteochondritis.

The differential diagnosis of congenital syphilis is from rickets and infantile scurvy. Congenital syphilis is more often found in the new-born or in early infancy whereas rickets and scurvy rarely occur before the fourth month. Each has its characteristic roentgen manifestation in the endochondral bone growth area. This includes the epiphysis, with the epiphyseal center of ossification when present, the diaphyso-epiphyseal junction, the zone of temporary calcification and the zone adjacent to it on the shaft side. Each of these is discussed.

The effect of treatment on the bone lesions will be published in a later report. Preliminary observations indicate that the osteochondritis responds more quickly than the periostitis.

JACOB SAGEL, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

VIRGIL J. SCHWARTZ,
PHYS. & SURG. BLDG., MINNEAPOLIS

ARTHUR C. DEAN
CROOKSTON CLINIC, CROOKSTON

THE RELATIONSHIP OF SINUSITIS AND BRONCHIECTASIS. Quinn and Meyer, Madison, Wis. (Arch. of Otolaryng., Aug., 1929, Vol. 10, No. 2, 152). It is not yet well enough known that many patients with symptoms suggesting pulmonary tuberculosis, but with repeatedly negative sputum, may have bronchiectasis, usually associated with chronic infection of the upper respiratory tract. Far too often these patients are treated for long periods in sanitaria for tuberculous patients. In cases of bronchiectasis from all causes it has been determined that sinusitis is of frequent occurrence. Complete investigation of the paranasal sinuses should be made in every case. Definite sinusitis has been found to be present in 57.9 per cent of a series of our cases. The large majority have no subjective symptoms of sinusitis and only a few complained of nasal or postnasal discharge. It is quite generally accepted that aspiration of infected material from the sinuses is possible. It is further assumed that this aspiration occurs chiefly when the person is asleep or at least in the recumbent position.

CONCLUSIONS

1. 57.9 per cent of our series with bronchiectasis were found to have a co-existent sinusitis.
2. The patients with sinusitis were considerably younger than those without.
3. The majority had no symptoms of sinusitis.
4. Aspiration of an oily fluid from the nose is so easy that it seems logical to believe that aspiration of infected material might also be easy.

ARTHUR C. DEAN, M.D., F.A.C.S.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

SURGICAL AND MEDICAL GYNECOLOGIC TECHNIC. Thomas H. Cherry, M.D., F.A.C.S., Professor of Gynecology, New York Post-Graduate Medical School and Hospital, etc. 678 pages. Illus. Cloth, $8.00. Philadelphia: F. A. Davis Company, 1929.

A STUDY OF MASTURBATION AND THE PSYCHOSEXUAL LIFE. John F. W. Meagher, M.D., F.A.C.P., Neurologist St. Mary's Hospital, Brooklyn; Neurologist Mary Immaculate Hospital, Jamaica, etc. Second edition. 130 pages. Cloth, $2.00. New York: William Wood & Company, 1929.

VARICOSE VEINS. H. O. McPheeters, M.D., Director, Varicose Veins and Ulcer Clinic, Minneapolis General Hospital. 208 pages. $3.50. Philadelphia: F. A. Davis Co., 1929.

Although the practice of obliteration of varicose veins by the injection method is by no means a new one, there has been so much written lately on the subject that one heralds with interest the publication of a small book summarizing the developments in this work.

The anatomical, embryological and pathological aspects of the subject of varices have been fairly well covered. Ample mention of work by various authors, both domestic and abroad, makes these chapters distinctly valuable.

Etiology has been covered in a broad way, mention of the various opinions of foreign authors being made. Reference is made to the age-sex factors, endocrine, infection, inflammatory and mechanical views of the etiology.

The diagnosis and differential diagnosis is rather disappointing. A rather sketchy description of Trendelenburg's sign is made but there is no mention of how one should proceed to elicit this sign. VonPerthe's modification of Trendelenburg's sign is mentioned but not enlarged upon. It is felt that a book should be an explanation of all phases of the subject covered, going into fine detail in its description of tests and diagnostic methods and further elucidation on the various types of Trendelenburg's sign would be beneficial.

Ulcer.crura and the various complications of varices have been described.

Treatment by general, operative, and injection methods has been well covered, and, as one would expect, the section on injection treatment is gone into fully. The various solutions which are being or have been used are mentioned but particular stress is laid upon the author's choices. Calorose and 20 per cent sodium chloride are given first place, with the use of bichloride of mercury, sodium salicylate or quinine and urethane as occasion arises.

Pathology of post-injection conditions in the veins is described very well.

The very common occurrence of ulcer crura, and its importance because of the marked disability and discomfort produced, is a subject of constant concern. It is gratifying to find this question covered so completely and the treatment so ably presented.

The impression one receives after reading this book is that there is too much repetition of thought and that the material is used to make a much bigger monograph than the subject deserves. Apart from this one disappointing feature, the work is quite interesting and worthy of the time consumed in reading it.

GEORGE WILLIAMSON, M.D.

SPINAL ANESTHESIA. Charles H. Evans, M.D. New York Post Graduate Medical School and Hospital. Introduction by W. Wayne Babcock. Foreword by Charles Gordon Heyd. 203 pages. Illus. Cloth, $5.50. New York: Paul Hoeber, 1929.

This volume presents an extremely conservative and well balanced review of the subject of spinal anesthesia. There are essentially two safe forms of technic in introducing spinal anesthesia. The author presents the method of dissolving powdered neocain in the spinal fluid direct, with immediate re-injection. The advantages and disadvantages are thoroughly given; and, best of all, the indications and contraindications are completely analyzed. From my own experience, I can agree with every statement this author makes and recommend this work to any one desiring to master the intricacies of spinal anesthesia. The author avoids the use of the anesthesia above the diaphragm. The chief advantages of this form of surgical aid pertain to abdominal operations, and it is in the abdominal region that there is least danger. The higher levels are not safe. This is all brought out in scientific detail with the aid of careful diction, accurate spelling and a large number of pictures. The printing is large, clear-cut, on heavy paper and the work is such as to be readable in one or two evenings. A very commendable volume within the comprehension of any surgeon who desires to add spinal anesthesia to his anesthetic armamentarium.

DANIEL H. BESSESEN, M.D.

GENERAL SURGERY. Evarts A. Graham, A.B., M.D., Professor of Surgery, Washington University Medical School. Practical Medicine Series. 800 pages. No price quoted. Chicago: Year Book Publishers, 1928.

This most interesting book of about seven hundred pages is packed with reports of unusually interesting cases, instructive extracts of various reports on research, and summaries of the developments in surgery in the past year.

Mention must be made of the reports on the treatment of erysipelas with Birkhaug's serum, the use of colloidal lead in the treatment of carcinoma, and the

control of postoperative or paralytic ileus by the use of splanchnic anesthesia.

The work on the use of carbon dioxide at the beginning and end of narcosis is reported. The improvements in pulmonary ventilation with the resulting speedier narcosis and earlier awakening of the patients demonstrates conclusively the value of this measure.

Sir G. L. Cheatle writes on carcinoma of the breast, urging patients to consult their surgeons if they experience pain in their breasts, bloody or serous discharge from the nipples, and not to wait for the development of the later sign of tumor formation.

The subject of pulmonary suppuration of various types is afforded generous extracts and is most valuable for anyone interested in the subject.

The question of diagnosis in pancreatic disease received some valuable assistance by the new tests outlined in the work by Elman and McCaughan.

Judd, of the Mayo Clinic, reports on 1,897 cases of gastro-duodenal ulcers, designating gastro-enterostomy as the most suitable surgical procedure. The popularity of extensive resections of the stomach is fast on the wane.

Interesting extracts on the injection treatment of varicose veins, the use of iodine in goiter prophylaxis and treatment, and Illingworth's report from Wilkie's Clinic on the types of gall-bladder infections also deserve mention.

An interesting little trick in the differential diagnosis of tumors is reported by Gosselin. If an ice bag is applied to the swelling which is to be differentiated from a lipoma or other fluctuating swelling and the mass becomes hard, the tumor is undoubtedly a lipoma, as this is the only tumor which will harden under the influence of cold. This simple procedure might easily prove valuable at times.

GEO. A. WILLIAMSON, M.D.

SYMPTOM DIAGNOSIS, REGIONAL AND GENERAL. Wilfred M. Barton, A.M., M.D., F.A.C.P., Associate Professor of Medicine, Medical Department of Georgetown University, and Wallace M. Yater, A.B., M.D., Fellow in Medicine, Mayo Foundation, Rochester. Cloth. Price, $10. Pp. 851. New York: D. Appleton & Company, 1927.

The book is intended for a quick and ready reference for the physician while the patient is being prepared for examination or may be considered as a quick review of differential diagnosis. The authors have endeavored to present the symptoms in the most practical way for the making of a diagnosis. The symptoms and signs are grouped as regional or general and the symptoms cover those of practically all medical and surgical conditions. The book is primarily for the office desk and has no place in the library. It should be particularly useful to the busy practitioner who wishes to refresh his memory very quickly.

A. E. CARDLE, M.D.

SYPHILIS — ACQUIRED AND HEREDITARY. Charles C. Dennie, B.S., M.D., Asst. Professor of Dermatology and Syphilology, University of Kansas School of Medicine. 304 pages. Illus. Price, $2.50. New York: Harper and Bros., 1928.

In this monograph the subject is presented in a lucid, interesting manner. While going into sufficient detail it does not go into statistics and minute details in which the specialist only is interested. But on the other hand it covers the subject very well for the average practitioner.

On page 225 a few typographical errors are found which might lead to serious consequences. The given dosages of neoarsphenamine at 6 months of age and sulpharsphenamine at the ages of 6 months and one year are ten times as large as intended.

H. D. DIESSNER, M.D.

NO DRUG CURES FOR CANCER IN INTERSTATE COMMERCE NOW

Drug cures for cancer do not exist in interstate drug trade to-day, say officials of the food, drug, and insecticide administration, United States Department of Agriculture, who are charged with the enforcement of the Federal food and drugs act.

During the last 22 years, a total of 68 notices of judgment have been issued against 42 so-called cancer cures. In the rare cases in which cancer cures enter interstate commerce to-day, they are seized at once and their shipper held liable for prosecution.

The Sherley amendment to the food and drugs act regulating the therapeutic claims for drugs was passed by Congress in 1913, as the result of circumstances arising out of a suit by the Government against Doctor Johnson's Mild Combination Treatment for Cancer. The case was carried to the Supreme Court, where a decision was rendered against the Government on the grounds that no provision existed in the food and drugs act that controlled curative claims for drugs.

With the recommendation of President Taft, Congress passed the amendment, which states that any drug will be deemed to be misbranded "if its package or label shall bear or contain any statement, design, or device regarding the curative or therapeutic value of such article or any of the ingredients or substances contained therein, which is false and fraudulent."

Enforcement of the food and drugs act since the passage of the Sherley amendment has resulted in the revisions of labels of thousands of medicinal preparations. It has further resulted in ridding the interstate drug trade of such obviously false and fraudulent products as tuberculosis cures, youth rejuvenator, cancer, and gonorrheal treatments and cures.

While there are still many misbranded products on the market, the administration is continually giving attention to these to the end of insuring a truthfully labeled drug supply to the American public.

WANTED—Staff physician for Minnesota State Hospital. Either single or married man. Suitable accommodations for married man will be furnished with maintenance. Salary $150 monthly. Address D-48, care MINNESOTA MEDICINE.

WANTED—Salaried appointments for Class A Physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Aznoe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

DENTIST WANTED—To take over well established practice recently vacated by dentist taking up institutional work in New York City. Town, 500, large territory; good office rooms—heat, light and running water. Rent reasonable. Nothing to buy. Give references. Address D-38, care MINNESOTA MEDICINE.

WANTED—Office or industrial position in Twin Cities by graduate nurse with private duty and office experience. Address D-47, care MINNESOTA MEDICINE.

WANTED—Position in reputable hospital or clinic, preferably Minneapolis or Saint Paul, by thoroughly trained and experienced laboratory technician, B.A., with accredited postgraduate course in routine laboratory technic, including metabolisms, tissues, Wassermann's, et cetera. Successfully managed laboratory in Eastern Clinic. Best of references. Address D-45, care MINNESOTA MEDICINE.

WANTED AT ONCE—Position as doctor's assistant. Minneapolis preferred. Ten years' experience as practical nurse. Some office experience. Used to meeting public. Good appearance. Telephone, South 4250, Minneapolis.

FOR SALE—Doctor's complete office equipment, mahogany desk, McCaskey filing cabinet, bookcase, chairs and instruments. Price very reasonable. Call Emerson 2273, Saint Paul, or write D-46, care MINNESOTA MEDICINE.

GOOD LOCATION—For physician at Cleveland and Marshall Avenues, Saint Paul. See Dr. L. M. Peifer, second floor over drug store.

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THE RECOGNITION AND TREATMENT OF RENAL LITHIASIS*

ARTHUR L. CHUTE, M.D.
Boston

IT is often difficult to say what it was that determined the formation of a renal stone in a given individual. An increase of some normal constituent of the urine, either an "actual" increase due to the presence of an abnormally large amount of the material, or a "relative" increase due to a decreased amount of fluid, is probably an important factor in this process of stone formation. Little anomalies of the kidney such as a dilated lower calyx or a kidney pelvis that does not quite empty itself probably cause a degree of urinary stasis that favors the precipitation of the mineral constituents that form stones. The presence of some albuminous material is said to favor this precipitation; by some it is said to be essential for its occurrence. Renal infections, especially those infections with the urea-splitting organisms, that produce an alkaline urine, are apparently a determining factor in many cases. Whatever our theory as to the formation of renal stones, we are faced by the fact that the condition is a common one, and one that is responsible for a great deal of suffering as well as a very great destruction of kidney tissue.

Their destructive power is so great that I believe it is fair to say any stone that remains indefinitely in a kidney and has the increase in size that these stones ordinarily have, will lead in the end to that kidney's total destruction. Not only this, but the danger of a renal stone that has passed into a ureter, and is, strictly speaking, a ureteral stone, is to be computed solely in terms of the risk to which it subjects its kidney. Furthermore, not only the danger but the pain a ureteral stone causes is due not to the trauma that it inflicts on the ureter, but to the degree that it distends the kidney pelvis. I shall have occasion to refer to this point later. A stone that had its origin in a kidney does not cease to menace that kidney until it has reached the bladder.

Within a short time I have had impressed upon me, through the death of a patient whom I had seen over a series of years, the slow but inexorable progress, even to a fatal termination, that urinary lithiasis may make unless recognized early and successfully treated. The patient in point, a woman of 58, whom I first saw in 1920, came with the story that for the previous five or six months she had been having pain in her right side. Examination showed a shadow of moderate size in the pelvis of her right kidney, which also showed a moderate degree of infection. Her left kidney contained the shadow of a large stone and was found to be destroyed functionally. It excreted nothing but moulds of pus. I removed by pyelolithotomy the stone in her right kidney pelvis and the patient made a good surgical convalescence. There was no history of pain at any time in her left kidney, the destroyed side; this I did not touch.

About three years after her pyelolithotomy this patient had a recurrence of symptoms in her right side. Even then it was found she had a phenolsulphonephthalein output of about 45 per cent. Again I operated upon her and removed two small stones. This time a nephrolithotomy was done. The patient had a stormy surgical convalescence, but from 1923 to the early part of 1928 was fairly well with the exception of occasional upsets, presumably due to a moderate degree of renal insufficiency. By the latter part of 1928 she was nauseated, markedly anemic, had a moderate amount of edema, and was found to have practically no output of phenolsulphone-

*Presented before the annual meeting of the Minnesota State Medical Association, St. Paul, May 14, 1929.

phthalein. She failed and died a short time later of renal insufficiency.

This patient's history illustrates strikingly several important things regarding urinary stones: (1) the lack of subjective symptoms that these patients with renal stones sometimes show, as illustrated by the condition in her left kidney, of which she had apparently never had any intimation; (2), the relentlessness of the process when not interfered with, as illustrated by the total destruction of the same kidney; (3) an unfortunate tendency that renal stones have to be bilateral; and finally our inablity to stop the destructive process after it gets beyond a certain point as illustrated by the fact that though at the second time I removed stones from her right kidney she had a very fair renal function and though from then, until the time of her death, this patient had no symptoms of any reformation of stones, yet the destructive process continued relentlessly until she had practically no renal function.

The most important point to my mind in this woman's history is the fact that her left kidney was destroyed when I first saw her, as proven by the radiographs that showed a large stone and by cystoscopy that showed the kidney had no urinary excretion; that it simply pushed out from time to time moulds of pus, and yet this patient said she had never had any symptoms referred to that side. I do not remember whether or not I went over the question of the process having been absolutely symptomless in great detail but I believe we may accept as a fact that it had never given any symptoms that had suggested the possibility of renal stone to either this patient or her doctor.

It is not a very uncommon thing to find a patient who has had a kidney practically destroyed by a stone and yet has had no symptoms that were sufficiently clearly marked to give a clue as to what was taking place. This I believe is our most serious difficulty in preventing the very great destruction that urinary stones, especially renal stones, do, since often they are not recognized until irreparable injury has been done.

This is not due to the fact that these stones do not actually produce symptoms but is due to the fact that they often do not produce symptoms which the man in general practice, to whom these patients almost invariably appeal first, has been accustomed to recognize as symptoms of renal stone. In the case of the patient I have cited it may perfectly well have been that all the discomfort she had suffered had been backache, a symptom common with women, together perhaps with a turbid urine, also easily overlooked in women.

For many generations before the introduction of the *x*-ray, two symptoms were associated with renal stone, excruciating pain in a loin or back and hematuria; and today many men find it hard to accept less striking symptoms as an indication of renal stone. It is true that excruciating pain may be met in such renal stones as block the kidney outlet and with this pain there is often associated more or less bleeding. In my experience, however, the excruciating pain commonly called colic is more often seen in patients in whom a stone has left a kidney and has started down a ureter, and where from time to time, and for no reason that we can clearly see, the stone is held by spasm of the irritated ureter. This spasm of the ureter leads to an acute dilatation of that section of the ureter above the stone and the corresponding kidney pelvis and to the occurrence of an acute hydronephrosis that is most painful. I have on a number of occasions been able to work a ureter catheter past a stone held by spasm in a ureter and draw off the urine that was distending the kidney pelvis; this has stopped literally within a minute or two a very acute pain that had been imperfectly controlled even by large doses of morphia. In one such instance, seen some years ago, after working a ureter catheter by a stone impacted in a ureter I withdrew from the kidney pelvis between 50 and 60 c.c. of urine with immediate relief to the patient's pain. The next day when I did a pyelogram, this same kidney pelvis would hold only between 6 and 8 c.c. of fluid. It is not surprising that such a marked overdistension should cause great pain.

As to the presence of hematuria, in a series of cases that I went over a few years ago, bleeding that was evident to the eye had been present in but 30 per cent of the cases; microscopic blood had been found in 41 per cent, though doubtless it was present at some time in all or practically all the cases. However valuable microscopic blood may be in confirming a diagnosis, once it has been suspected, it has but little suggestive value. Unfortunately the stones held

firmly in a kidney, the large ones that cause atrophy of kidney tissue by pressure as they increase in size and predispose to suppuration, the ones that are especially destructive, do not cause the marked symptoms that are brought about by the smaller stones that block the kidney outlet and produce acute dilatation of the kidney pelvis. These large stones may produce only a moderate degree of pain, usually a backache, and this not necessarily a constant pain but one that may recur at periods over a very long time. In the case of two patients from whom I removed wholly disorganized kidneys for calculous pyonephrosis, the symptom of backache had recurred over periods of twenty and thirty-five years respectively before these patients had made a real determined effort to find the cause of the discomfort and be relieved of it. A man, from who I removed a kidney which had been reduced to a mere shell by a calculous hydronephrosis, had only the history of a short attack of pain in the same loin some fourteen years before, then freedom from all symptoms up until about two weeks before he had come to me, when he had a slight hematuria.

Another man from whom I removed a renal stone some years ago with relief of his symptoms, had suffered from pain in the upper abdomen, treated as dyspepsia over a period of twenty years; it was not until he applied for life insurance and it was found that his urine contained pus that the cause of his trouble was recognized and remedied.

Last fall a somewhat similar case came under my care. This was a man of fifty, who had suffered from "indigestion" for four years and in whose urine pus had been found when he had applied for life insurance. The pus was found to depend upon a stone in his left kidney, which was removed. At last report he was free from his indigestion. These are not excessively rare examples of the confusing subjective symptoms that patients with renal stone may present; in fact a predominance of digestive symptoms occurred in 15 per cent of a small series of cases of renal stone that I went over some years ago. In a few instances of stone in a kidney the subjective symptoms, if there are any, will be so vague as not to suggest the condition and the only objective sign may be a turbid urine.

In spite of the more unusual cases, however, pain in varying degree is the most common sign of a kidney stone. This pain may be in the back, loin, or abdomen, and vary from the excruciating and characteristic pain of kidney colic to a slight grumbling discomfort. A history of blood in the urine will be present in about a third of the cases. Bleeding is much more suggestive if it appears regularly as a result of exercise.

In a condition that is so common and so destructive and yet in which the signs may be so vague, we are most fortunate in having so accurate a diagnostic means as we have in radiography. Much as the surgeon or the general practitioner may dislike to make the confession, we shall have to admit that we are wholly dependent upon the help of the radiographer for early and accurate diagnosis in most cases of renal stone. We may suspect the condition but that is as far as we can go unaided in a very large proportion of cases. A good radiograph, however, in a patient who is not too fat and who has been properly prepared, should show a shadow in all cases of renal stone with the exception of a few small uric acid stones. Furthermore, as a good renal x-ray will show the outline of the kidney and its relation to the shadow of the stone, it will give a pretty good idea of the position that the stone occupies in the kidney.

We are so dependent upon the x-ray in our study of these cases that I shall consider this subject somewhat in detail. In order that we may not be led to draw false conclusions from radiography of the urinary tract, it is essential that certain precautions be observed in taking the plates. It is a very common thing when one is seeking the cause of some rather obscure abdominal pain to make use of a barium meal or a barium enema. If this investigation has been negative, the patient may then be radiographed as to the question of urinary stone. Under these circumstances bits of barium left in the intestine may so overlie the stone-bearing area of a kidney as to raise a question as to the nature of a given shadow. Therefore, it is wise, if one foresees the necessity of radiographs of the genito-urinary tract, to have these taken before gastro-intestinal plates are taken, of if barium plates have already been taken that an interval be allowed to elapse before renal plates are made. Another important point in the technic of taking x-ray plates, when the question is that of urinary stone, is to take the whole tract. Very often a patient will have symptoms so sharply referred to one or the

other kidney that radiographs may be taken solely of that kidney region. I have in mind two instances where this led to a most unfortunate outcome since in both these patients the painful kidney was removed, only to find that later radiographs showed that the renal pain was undoubtedly due to stones that were caught low down in the ureter of the corresponding side and were producing the renal pain by urinary back pressure. In every instance in which one has the urinary tract radiographed because of a suspected urinary stone, one should be sure that the first set of films cover the whole region of the kidneys and ureters down to and including the bladder; otherwise, one will occasionally overlook a ureteral stone that is causing kidney pain, or a ureteral stone that accompanies a renal stone. In the first instance it is possible that a kidney may be sacrificed needlessly; in the second, the removal of the renal stone would probably be followed by a urinary sinus until such time as the ureteral stone had been recognized and removed. Further radiographs may often be confined with advantage to a limited area of the urinary tract but the first renal *x*-ray should include the whole stone-bearing area of the urinary tract; it should also show the kidney outline and its stone-bearing area free from overlying gas shadows, otherwise the film will have but little negative value.

Some of the radiographs taken in patients whom we suspect of harboring renal stones will show no shadows; others will show a shadow. In what cases shall we accept the negative evidence as final and in what cases not? It has been pretty definitely proved that small uric acid stones may not be brought out by a radiograph, especially if they are lying in a collection of urine. Therefore, if a patient's symptoms have impressed one strongly with the probability of stone, it is wise, in the case of a negative film, to pass a ureter catheter up to the kidney in question and if it contains a residual urine, to draw this off and then take radiographs. If after the residual has been withdrawn, the plates are still negative, one may put a small amount of pyelographic medium into the kidney pelvis and take further plates. These may show in the case of a calculus a pale shadow, framed in a denser one; if these tests are negative, we may safely assume that the kidney in question contains no stone of any size. However, it is always well in a very suggestive case to "save one's exceptions" so to speak, as it has been my experience that a small uric acid stone will from time to time be passed from a kidney in which I have been wholly unable to demonstrate its presence. Under these conditions, however, the stones have been so small that their presence has been more of academic interest than of surgical importance. So much for the value of the negative evidence that *x*-rays may show.

When we come to the cases in which radiographs show positive shadows, our diagnostic work is by no means finished. We have to differentiate carefully between the shadows that indicate renal stones and the shadows that indicate other more or less common conditions. When we are considering the question of renal stones we are concerned only with shadows that overlie the kidney outline, my reason for insisting that a satisfactory renal radiograph must show this outline. There are certain branched, coral-like shadows that we see overlying a kidney outline which can be nothing but renal stones and it is unnecessary to go further as regards the question of diagnosis. There are also shadows, much the shape of a peach stone, that are very suggestive.

A number, however, of the shadows that we find overlying the kidney outline are not associated with the urinary tract at all. The first of these shadows that we shall consider are those made up of things that are in the intestine. One sometimes sees little hardened masses of feces or bits of bone or other foreign matter taken with the food. I have already spoken of the confusion which masses of barium may make. A large mass may quite conceal the stone-bearing area of a kidney while a small mass may give a shadow suggestive of stone. The various things in the intestine will, however, usually be found to have changed position in two radiographs. If doubt still exists, a vigorous clearing out of the bowel will remedy the condition. Intestinal gas gives a dark shadow instead of a light shadow such as stone gives and will not cause any particular confusion in this respect. Intestinal gas is, however, particularly likely to be held over a sensitive kidney, such as one harboring a stone, and cause trouble by obscuring its stone-bearing area. As with intestinal contents, intestinal gas will be likely to change its position in two radiographs and should, of course, be largely done

away with by an adequate pre-*x*-ray bowel preparation.

The two sorts of shadows that are most difficult to differentiate from a stone in a kidney are the shadows of gallstone and those of calcified abdominal glands. Gallstones can cause confusion only on the right side. Calcified abdominal glands are common and may be found all over the abdomen. Along the lower course of the ureter, in the anatomical pelvis, there may be not only calcified glands, but calcified vessels and phleboliths to differentiate from ureteral stones.

The density of the shadows cast by gallstones varies with the amount of calcium the stones contain. They vary somewhat in shape but are almost invariably round. A few may have a density which would be compatible with that of a kidney stone. Most gallstones, however, that we are called upon to differentiate from renal stones are easily recognized. The larger ones are made up of a series of concentric rings, the smaller ones of faint shadowy rings, and the very small ones of an accumulation of very faint rings. Some gallstone shadows will be seen to be clearly to the outside of the kidney outline. The Graham test will sometimes make it clear that a doubtful shadow, overlying the kidney outline, is really in the gall-bladder. In most instances of gallstones the position and general appearance of the shadow are such as to make it evident that it is not a renal stone. In an occasional case it may be necessary to have recourse to pyelography to determine the position that such a shadow bears to the renal pelvis and calyces. I have stated before, and still believe, it is much more common to see a gall-bladder opened where the real lesion is a kidney, than to have a kidney explored where the lesion is a gallstone.

The shadow of a calcified abdominal gland, supposed to be the end-result of a tuberculous invasion, is the commonest condition that I know to simulate the appearance of a urinary stone. Both the mesenteric and retroperitoneal glands may be involved in this process. These patients suffer from more or less abdominal pain, though it is supposed that the glands that are painful are not the calcified ones which the *x*-ray shows, but others in which the inflammatory process has not gone on to calcification but is still more or less acute. These shadows often raise the question of a renal or ureteral stone. They will, however, have a mottled or granular appearance that is quite characteristic; furthermore, a mesenteric gland, being movable, will often change its position materially in two films. A calcified retroperitoneal gland is more fixed than a mesenteric gland but has the same mottling. In doubtful cases it may be necessary to make use of a radiographic catheter or a pyelogram or both to distinguish between these shadows of calcified glands and renal or ureteral stones. These maneuvers will, however, usually make the condition quite clear.

A ureteral stone is simply a renal stone that has been extruded from the kidney; this is nature's way of curing the condition, and is what I suppose actually takes place in a very large proportion of cases. As a rule, a stone that has gone down into a ureter exposes its kidney to less danger than if it had remained in the kidney itself, since it does not produce the atrophy by pressure upon the renal tissue that such a stone does if it remains in the kidney and increases in size. A stone in a ureter may still, however, be a very great menace to a kidney. I have referred to one instance in which a stone caught in a ureter led to the total destruction of its kidney through the hydronephrosis that it had produced. When in its passage to the bladder a ureteral stone irritates the ureter and causes it to contract violently about it, we have an attack of renal colic: the very excruciating pain that was formerly considered typical of renal stone. This is often accompanied by a little hematuria and sometimes by pain referred to the scrotum on the corresponding side, if the stone is low in the ureter. In the intervals between these attacks of colic a ureteral stone may give little or nothing in the way of subjective symptoms.

When a ureteral stone is situated anywhere but the lowest part of a ureter, its radiographic diagnosis is usually very easy, but even so there are few ureteral stones that I care to cut down upon without verifying my diagnosis by the passage of an *x*-ray catheter. Usually this will be enough to show that the shadow of the catheter is in close apposition to the stone shadow. If this is not convincing, an "offset" plate consisting of two exposures on a single film, the second taken after moving the lamp a short distance laterally, will usually settle the question. If in such a plate the stone shadow bears the same re-

lation to the catheter in both exposures we may be sure that it is in the same plane and consequently in the ureter. A more conclusive test may be made by filling a ureter with pyelographic medium and withdrawing the catheter. A ureteral stone will often hold the column of fluid above it very sharply and it may also show a distinctly widened ureter. These methods of differentiation will have to be used most frequently in the case of doubtful shadows in the lower part of a ureter; they will usually allow one to make a very accurate diagnosis.

As I have stated, it is my belief that every renal stone, if allowed to remain indefinitely, will lead eventually to the destruction of the kidney harboring it, either through the atrophy of kidney tissue caused by its increasing size or by the infection that comes sooner or later. I do not believe, however, that every renal stone should necessarily be removed the moment it is discovered. There are some very small stones that may cause pain and even bleeding and yet it may be unwise to attempt their removal. On two occasions at least I have attempted the removal of very small renal stones that were very elusive. In my search for these I so injured the kidneys that I had to remove them in both instances. I found the stones in the removed kidneys.

The location of the stone, too, makes a difference as to its ease of removal. It will be much easier to find and remove a small stone that is in a kidney pelvis than it will one that is in a lower calyx. I have seen within a week a patient in whose left kidney I found a very small shadow, 3-4 mm., 16 months ago, and who has returned from time to time for observation and radiography. In her last *x*-rays taken in April the stone had moved into the kidney pelvis, from the lower calyx. It has not increased in size so far as we can see nor has it caused infection nor a degree of pain that has been disabling. A stone of this type, I believe, it is fair to watch for a long time in the hope and with the reasonable expectation that it will be passed. When it comes to a renal stone that is more than 5-6 mm., roughly a quarter of an inch, in its smallest diameter, I believe we should advise its removal unless there is some definite contra-indication. Any renal stone is a foreign body and not only this but a foreign body that is bound to increase in size and the excretory work of the kidney makes its ultimate infection almost certain.

A stone in an infected kidney should be removed fairly promptly. In a few instances, however, I have advised against the removal of a totally destroyed stone-kidney in a patient whose kidney was draining well and who, I thought, was too poor a risk.

Some interesting problems come up in dealing with renal stones; thus it is especially important to remove a stone in a single kidney; though the danger of operation is greater than if the patient had a wider margin of safety in the way of renal tissue, yet this lessened amount of renal tissue makes imperative the conservation of as much of it as is possible and justifies one in taking an increased immediate risk to this end.

With bilateral renal stones, and the condition is not uncommon (occurring in 12 per cent in a series of stone cases that I looked up some time ago), all one's renal tissue is in jeopardy, just as is the case with a stone in a single kidney, and one must urge operation strongly though the indication is perhaps not quite so imperative as in the case of a stone in a single kidney. When stones are present in both kidneys, the better kidney should be operated upon first, if one can decide which one is the better; this the function test will usually tell us. In many of these bilateral cases I believe a bilateral renal infection was the cause of the stone. At any rate it is very common to find both kidneys infected at the time we first see these patients.

With a stone in a kidney and another in the ureter of the same side, either the removal of both should be done at the same time or one should remove the renal stone first, as its removal will tend to stop the destruction of renal tissue, and then remove the ureteral stone during the convalescence or as soon thereafter as possible. It is probable that a loin fistula will persist until the removal of the ureteral obstruction.

Relatively small uninfected renal stones in the kidney pelvis should be removed by pyelolithotomy, a relatively safe and easy operation when a kidney can be brought up onto the loin or even into the incision. The incision in the pelvis should be on its posterior surface and in the direction of its long axis. While the posterior surface of the pelvis is usually free of vessels, anomalies are so frequent that the operator must assure himself that the proposed line of incision is free of vessels of any considerable size. Because of this variability of the renal blood supply, one

may find in a given case that the anterior surface of the renal pelvis is the safer place to open it. The incision in the renal pelvis should be long enough to allow the removal of the stone in question without producing too much trauma. Should it be necessary to enlarge one's incision, it is better to increase it into the hilum of the kidney rather than into the upper end of the ureter. After the stone has been removed it should be examined as to whether it has any broken surfaces or as to whether it presents any facet indicative of the presence of broken fragments or of other stones. If one finds either of these conditions, one should continue his search to find and remove the broken piece or to find the remaining stone that caused the facet on the removed stone. The incision in the kidney pelvis should then be brought together with fine catgut It is especially important that one repair with care the incision into the hilum of the kidney if it has been necessary to make one. Sometimes a small oozing vessel must be controlled by a fine catgut stitch. If possible a small bit of perirenal fat should be put over one's line of incision.

I have always believed that it was a mistake to drain a kidney pelvis through a pyelotomy wound, especially by tube drainage, for the reason that stubborn fistulæ have on occasion followed this. For this reason I consider pyelotomy is not so desirable if there exists any particular degree of infection. If for any reason one finds more infection than he expected and wishes to drain a kidney on which he has done a pyelolithotomy, he should make an incision from the cortex down through into the kidney pelvis and put in a tube. Likewise if one displaces a stone from the kidney pelvis up into a calyx and cannot remove it by means of forceps I believe it is wise to open through the cortex and remove it. I find that in a few cases it is of advantage to combine a nephrostomy with a pyelolithotomy. If a kidney is bound down by adhesions or if a kidney has been operated upon previously it is oftentimes very difficult to mobilize it sufficiently to do a pyelolithotomy. The operation, however, is most useful in a considerable number of kidney stones.

Nephrolithotomy is, however, the operation that in my experience one is forced to employ in the greater number of cases of renal stone. In this operation, after the kidney has been mobilized as much as possible, even to the point of bringing it out into or onto the loin incision, one should make an incision on its convex surface just behind the midline. This should be carried down to the renal pelvis. This incision will vary from one to three inches in length, depending upon the size of the stone to be removed, and should be so placed as to bring its center over the position that the stone is felt to occupy by palpation or is seen to occupy from the *x*-ray. Various ways of opening a kidney other than by a knife have been advocated at times, such, for instance, as passing a needle threaded with wire through it longitudinally and sawing the kidney open with the idea that it causes less hemorrhage than a clean incision. I have not used any of these methods but simply cut down onto the stone with a knife. After the cortical incision has been made, a stone of moderate size can often be grasped by forceps and removed very easily. A small stone may be difficult to find. A large branching stone may require that a kidney be opened from pole to pole and the utmost care exercised in working the stone loose from the calyces and the pelvis. If on examining a stone of this type it is found that bits have broken off, the kidney should be carefully irrigated with sterile water to wash them out if possible. I personally have not used the portable *x*-ray at the time of operation although I believe that it is of a very considerable advantage in a limited number of cases. It is well to remember that if a kidney shows multiple stones one must be sure to get the full number shown and must even consider the possibility of a greater number, as I have had the experience of finding more stones than my *x*-ray called for, when one has been directly behind another. I believe that a nephrolithotomy incision should rarely be closed without drainage. I have seen a number of instances in which this was done and the kidney had to be reopened and drained because of hemorrhage. I think the best way to prevent this postoperative bleeding is to carry a relatively soft drainage tube, perhaps one-fourth inch in diameter, through into the kidney pelvis, and then bring the renal tissue together by deep catgut sutures on either side of this tube, spaced perhaps at half inch intervals. Bleeding which may have been very profuse during the time of operation usually ceases when the kidney is replaced in the loin. I feel that it is desirable to make use of a tube with a "fish tail" end in draining a kidney pelvis.

When I used tubes with lateral openings I sometimes had quite a sharp bleeding at the time I removed the tube, due to pulling off granulations that had pushed into its lateral eyes. It is sometimes necessary to drain a kidney for some little time if it has been infected; adequate drainage likewise gives a cavity that has resulted from the growth of a stone its best chance to obliterate itself. Both these measures tend to diminish the tendency to the reformation of a renal stone which, at best, is only too common.

Those patients who present a calculous pyonephrosis must be subjected to nephrectomy. In any case in which, however, there is a fair possibility that a conservative operation may succeed I believe that we should make it the rule to do this. It is perfectly true that we shall have to do a secondary nephrectomy in a certain number of these cases but in a few we shall bring about a saving of renal tissue that may add materially to the length of a patient's life.

In theory a stone that has entered a ureter should make its way to the bladder and I dare say that the great majority do, but we know a certain number do not before at least bringing about a total destruction of the corresponding kidney. My rule is that a stone in a ureter that shows any particular degree of infection should be removed, likewise a stone in a ureter that causes more than moderate pain or occasional disability had better be removed. Nor do I think we should allow a ureteral stone to remain at one place for too long a time for fear of thickening of the ureter that may lead to a real narrowing later. When one asks just what "too long a time" is, I shall have to confess my inability to define it.

When the pain of a stone low in the ureter is moderate, I am inclined to try "dilating" the ureter with one or more ureteral catheters. These I sometimes leave in place for a day or more. In some instances a stone has been passed shortly after the removal of the catheter; in other instances I have tried this maneuver without the slightest success. It has in my opinion a definite field of usefulness in the case of non-infected small stones low in a ureter. With the larger stones and especially in the infected cases I doubt the wisdom of using this procedure. One of our chief objects in the removal of a ureteral stone is to conserve the kidney as much as possible. When infection has taken place I believe the immediate surgical removal of a ureteral stone is a far safer procedure than dilatation of the ureter.

A ureteral stone may be reached at any point along the course of the ureter by a retroperitoneal incision. A ureteral stone as low as the lower border of the third lumbar vertebra may be reached easily by the oblique incision, commonly used to explore the kidney. To reach a ureteral stone below the body of the third lumbar an incision that starts a finger's breadth internal to the anterior superior spine and extends downward, parallel to the fold of the groin and about three-fourths of an inch internal to it and ends above the pubes, a modified Pfannensteil incision, gives a good exposure of the lower end of the ureter, as does a straight incision along the outer edge of the rectus muscle. In both these incisions the peritoneum is displaced inward and the ureter if dilated will be easily recognized even in the depths of the pelvis. If it is not dilated, it must be searched for at the brim of the pelvis, where it will be found crossing the external iliac artery just at the point where this vessel leaves the common iliac. The ureter at this point often adheres to the peritoneum. Once found it may be followed practically to the point where it enters the bladder wall.

In all cases but those in which a stone is impacted in the lowest part of a ureter, one should, if possible, have an *x*-ray taken just before operation. A short time ago a stone in a dilated ureter that had given a good deal of discomfort and had been located well up in my diagnostic *x*-rays was shown by a preoperative *x*-ray to be low in the ureter, from which position I removed it.

It is at times very easy unintentionally to displace upward to a point where one may have to extend his incision in order to remove a stone that is relatively low in a dilated ureter. On the other hand, it is at times most difficult to "milk" a stone that is impacted in the lower part of the ureter. up to a point where it is easier to open the ureter than is the case in the depths of the pelvis. Occasionally a curved stone forceps may be introduced through an incision in a ureter, an inch or two above an impacted stone, and the stone grasped and pulled back. In a very few instances the introduction of a probe has served to push a stone, held in the lowest part of a ureter, through into the bladder. Occasionally one may be able to isolate a ureter in its lowest part

so that he can grasp an impacted stone between his thumb and forefinger and cut down upon it. This blind procedure is to be avoided, if possible, but may occasionally be necessary. The vas deferens is in very close relation to the ureter in its lowest part and may be injured by this procedure. I have seen a mild epididymitis follow a ureterolithotomy where one had bruised the lower end of the ureter and presumably the vas as well in the removal of an impacted stone. After the removal of a stone low in a ureter, one should always make sure that he can pass a probe through into the bladder without any sensation of grating.

If after the removal of a stone an incision in a ureter can be brought together with 0 or 00 catgut, it expedites its closure. A rubber wick should be carried down to the incision in the ureter, for most of these incisions leak for a time but the rule is that they close whether they are brought together or not. When they do not close promptly an inlying ureter catheter for a few days has always brought about the desired result.

The frequency with which we see the recurrence of renal stone following operation impresses me more and more with the importance of the after-care of these patients. In this we have not alone the factor that predisposed to the original stone formation with which to cope but also certain additional factors, the result of the original stone, such, for instance, as deformities of the kidney calyces and pelvis that favor retention and persistence of infection, both probably important factors in the reformation of stone. This is a large question that merits our most careful study but one, however, that we cannot consider at this time.

SURGICAL TECHNIC IN THE TREATMENT OF URINARY LITHIASIS*

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THE Minnesota State Medical Association is most fortunate in having Dr. Arthur Chute of Boston as one of its guest speakers. He is recognized as a leader among urologists of this country, because from his vast experience in surgery he is able to demonstrate all the pertinent facts known concerning any subject in the field of urology. The paper which Dr. Chute has just read has thoroughly covered, in a few words, every point concerning the subject of "The Recognition and Treatment of Renal Lithiasis." This paper contains so much of practical value that any practitioner who has heard it will leave this room with a usable knowledge of the subject.

My discussion of surgical technic will emphasize statements made by Dr. Chute and will give you my personal reasons for suggested changes in our present surgical treatment of renal lithiasis.

The exact etiology of renal stone is not known. Certain facts concerning its formation are accepted by most surgeons. Renal infection plays a major rôle in the development of these stones and interference with drainage most surely predisposes a kidney to stone formation. Any condition which does not permit the easy passage of urine through the ureter from the pelvis of the kidney will interfere with the passage of small calculi through the ureter. The part which chemistry plays in the formation of the urine is not clearly understood. Some clinical experience points to the fact that the ingestion into the body of certain foods, and more particularly of water high in mineral salt content, is likely to cause the formation of stone. People who live in countries where animal parasites are frequent invaders of the body through food or water have frequently urinary stones. Since human kidneys cannot be the subject of experimentation in vivo, the factor or factors directly responsible for renal stone development will necessarily remain somewhat conjectural.

Since infection and interference with drainage are etiologic factors which the surgeon may control, I believe that his surgical technic must take these into consideration.

Conservatism in renal surgery is practiced by all urologists and most surgeons who have had sufficient experience to make accurate urologic diagnoses. This is particularly true when the treatment of renal calculus is considered. Wide surgical exposure is necessary. The incision must be sufficient to allow easy and thorough examination of the kidney and the renal pedicle. Anomalous blood vessels, either in the pedicle or in the lower pole of the kidney, must be recognized, so that if nephrectomy must be done or if accidents occur, the pedicle or the anomalous vessels may be clamped and bleeding controlled. For exploration of the kidney and ureter I like the loin incision of the hockey-stick type, which permits easy exploration of the upper two-fifths of the ureter. This incision may be enlarged to allow exposure of the upper three-fifths of the ureter if necessary. A midline suprapubic incision will permit exploration of the lower two-fifths of the ureter. With this type of incision, one is very much surprised at the ease with which the ureter may be mobilized at its entrance to the bladder and followed in its course through the bony pelvis.

Operations for the removal of stone from the kidney consist of incisions through the pelvis of the kidney or through the cortex. The majority of these are through the pelvis and the posterior approach is usually selected.

If merely a pelvo-lithotomy were done for the relief of stone in the kidney, many patients would not be relieved at all of their symptoms and a recurrence of stone would be frequent. Since all renal stones originate in the pelvis in a minute form, one wonders why they do not pass out of the pelvis and through the ureter while they are still small. In addition to the removal of the stone from the pelvis, the surgeon should be sure that there is nothing extra-ureteral or extra-pelvic, such as bands, anomalous blood ves-

*From the Department of Urology and Dermatology, The Nicollet Clinic of Minneapolis. Read before the Minnesota State Medical Association meeting, St. Paul, May 15, 1929.

sels, or inflammatory adhesions that immobilize the ureter and produce turns or kinks which constrict it. These are frequently found at or near the uretero-pelvic juncture. The exploration of the upper ureter and the uretero-pelvic juncture for these conditions must be made with the kidney in its usual position before it is delivered into the wound. Very frequently if the kidney is delivered outside the wound, conditions of this character may not be observed.

In addition to this exploration of the outside of the ureter and uretero-pelvic juncture just described, I believe that in every instance the incision that is made in the pelvis of the kidney for the removal of stone should be large enough to permit the surgeon to explore visually from within the uretero-pelvic juncture. We have observed many cases of narrowing at the uretero-pelvic juncture, either as the result of the continuous irritation of the stone, or of infection, or both, without external evidence of this condition.

Many pyelograms made to orient stone shadows within the kidney show a pelvic deformity at the uretero-pelvic juncture. This may consist of an over-riding of the upper ureter by the lowermost part of the pelvic shadow. In other words, the pyelogram outlines indicate that the juncture of the ureter with the pelvis is above the lowest part of the pelvis. This pelvic deformity, although not always an indication of intra- or extra-ureteral narrowing or trap formation, should cause the surgeon to thoroughly inspect the renal pelvis at its juncture with the ureter, from within as well as from without. When in doubt, a plastic operation should be done. Many of these conditions at the uretero-pelvic juncture are congenital, and therefore frequently bilateral. Since these obstructions interfere with drainage, they predispose the kidney to infection as well as to stone formation.

Two recent instances, which will be illustrated by lantern slides, will show that the patients would not have been relieved of their symptoms if an obstruction at the uretero-pelvic juncture had not been found in this manner. When obstruction in this area is found, some plastic operation should be done which will widen the area and thus improve the drainage from the kidney.

During the last few years, pyeloscopy has been developed to such an extent that it is useful in determining the function of the renal pelvis and the ureter, together with the emptying time of the renal pelvis. I am sure that if this diagnostic aid is used in conjunction with pyelography, we will find many intra- and extra-ureteral swellings or obstructions which interfere with drainage of the sodium iodide from the kidney sufficiently to lengthen the normal emptying time and make this easily visible on the screen.

Except in an emergency, where one kidney has already been operated upon, my personal opinion is that wide section of the kidney or an incision through the cortex for the removal of stone is not justified. All of these kidneys are infected, the bleeding is not easily controlled, and either infection or bleeding may make eventual removal of the kidney necessary. I have never been able to excuse myself when I have made even a small incision through the cortex of the kidney to remove a small stone. The chance that a small stone may get into the ureter is great (unless the uretero-pelvic juncture is obstructed), and the operation for its removal through the pelvis, comparatively speaking, is slight, and I therefore think that the patient should have the benefit of waiting until this may be done.

After a calculus has been removed from the upper urinary tract, that is, the renal pelvis, the kidney itself, or the ureter, thorough exploration of the uretero-pelvic juncture and the ureter should be made by means of bougies, before the incision is closed. A radiogram or fluoroscopic exploration of the kidney, outside the loin wound, should be made, to be sure that no stone fragments are allowed to remain, or that no unsuspected stone may be present. A fistula through the loin incision is frequently caused by an unsuspected stone fragment which has been pushed into the ureter.

If at the time of operation the surgeon removes a stone, explores the kidney pelvis and ureter so that he knows that drainage is complete, he then has to face the question of the removal of infection already in the kidney and the control of quiescent infection. Since this is a major factor in the production of renal stones, I believe that every patient should be thoroughly studied for focal infections. To control the remaining infection in the renal pelvis or upper ureter, my patients are advised to submit to regular pelvic lavage for at least six months following the removal of stone. In every instance, I insist that all foci of infection be removed.

PERVERSIONS OF THE FUNCTION OF THE DIAPHRAGM*

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GENERALLY, the diaphragm is considered as a muscle important for its share in the phenomenon of respiration and as a partition between the abdomen and chest. Various phases of its function, normal and perverted, have great interest for the surgeon, and my own interest has been stimulated by a series of studies now being made in our clinic, a preliminary report of which has been made to the recent meeting of the American Association for Thoracic Surgery. No attempt will be made to write a complete report upon the diaphragm, the recent papers of Lemon, Campbell, Funk, and, further back, those of Hoover, being quite informative.

The diaphragm develops very early in embryonic life, arises toward the head and migrates caudally. Its ventral pericardial portion is formed from the septum transversum, its lateral portion from the pleuro-peritoneal membrane and parts derived from the body wall, and the medial dorsal portion from the primitive mesentery. The derivation from the body wall has been in dispute because of the uncertainty regarding the innervation by the intercostal nerves.

The comparative anatomy of the diaphragm has received considerable attention, particularly from Keith, Jones and Kingsley, to mention but a few. Lemon concludes that "it would appear from the study of comparative anatomy that structures similar to the diaphragm play varying parts in respiration, acting as expiratory, as inspiratory and at other times as both expiratory and inspiratory organs. Without doubt higher forms of animals, possessing true lungs and equipped with musculature which provides efficient respiration, breathe without the aid of a diaphragm. It is likewise true that a perfected diaphragm coincides with a mechanism developed to support high intracelomic pressure. All of these facts lead one to believe that the providing of pressure is the chief and primary function of the diaphragm and that its purpose as a partition is to allow the increased pressure to act on abdominal viscera permitting them to discharge their contents (fecal matter, urine and offspring), while at the same time the heart and lungs are spared the effects of the same pressure. It would appear that animals such as the dog can maintain respiratory efficiency without impairment when half of the diaphragm has been paralyzed and even when both sides are functionless and, in fact, a hindrance to respiration. In such animals the diaphragm does not compare in functional importance with the heart."

As a result of hundreds of observations after unilateral phrenic exeresis, it is apparent that man can live comfortably with hemi-paralysis of the diaphragm but I am not impressed by the reports of cases of bilateral phrenicotomy for persistent singultus as not causing noteworthy respiratory disturbance. In the past few years I have frozen the phrenics on both sides five times and, while the singultus was cured, the diaphragm *did* move, as seen by the fluoroscope shortly after operation, showing evidence of the transmission of motor impulses below the level of freezing by way of the accessory derivation.

Lemon found that a dog can live comfortably without diaphragmatic movement but the evidence regarding man is rather scanty. Neuhofer[2] has reported the case of a boy eight years old who had phrenicotomy done on both sides. Over three years later the diaphragm was found still practically immovable. The boy had developed normally, the thoracic respiration answering all purposes. However, vital capacity, restriction of external respiration and impaired competency are bound to result. Epstein[3] believes that the hypoventilation will predispose the patient to respiratory infections.

The anatomy of the diaphragm in man is well known and does not need detailed description. It has been spoken of as the most important muscle of the body, next to the heart. This is no doubt true under normal conditions, Lee[1] and his associates, of Columbia University, having found under various experimental conditions that it is vastly superior, physiologically, to other muscles studied.

"The peripheral edges of the diaphragm are

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attached behind to the lumbar vertebræ, laterally to the lower edges of the six lower ribs and their cartilages, and in front to the tip of the ensiform cartilage. The fibers converge to enter the central tendon, and the lateral sheets are pressed upward by the intra-abdominal positive and intrathoracic negative pressures, so that they form a dome-shaped vault, with the liver in the right side and the stomach and the spleen on the left."

"Because of its attachments to the lower six ribs, the contraction of the diaphragm tends to pull the margins of the ribs towards the median line, but under normal conditions this movement is opposed by the action of the external intercostals in raising the ribs and expanding the horizontal diameters of the thorax, and by the lower vertebral muscles, which fix the position of the lower ribs." (MacLeod.)

Hoover[4, 5] has given the greatest impetus to the study of the movements of the diaphragm and its significance in disease. He called attention to the fact that clinicians concerned themselves mostly with the density of the lung and some adventitious sounds and neglected the study of volume and extensibility of the lung. He studied particularly the movements of the costal margin and showed that phrenic contraction tended to narrow the subcostal angle, and maintain or enlarge the longitudinal diameter of the thorax. Variations in respiratory movements of the lower end of the sternum, subcostal angle and costal borders from the ninth rib to the subcostal angle, the epigastrium and hypochondria all depend on the higher or lower positions of the diaphragm. The diaphragm is correlated with the scaleni and intercostal muscles but antagonistic in its resistance to lessening of the longitudinal diameter of the thorax. The movement of the costal margins expresses accurately the balance between the intercostal muscles and the diaphragm in their contest for mastery of the costal margins. Hoover mentions a case in which physical signs suggested thoracic empyema following acute appendicitis. There was dullness at the base, diminished tactile fremitus, diminution of the intensity of the respiratory sound with elevation in pitch. But, the costal border of the affected side had a greater lateral excursion than the sound side. This meant a loss of the normal antagonism of the diaphragm to the action of the scaleni and intercostals of the affected side, hence an upward displacement of the diaphragm and a subphrenic abscess.

The surgical anatomy of the diaphragm has been ingeniously applied by Mosher[6] and by Jackson.

From various studies Mosher found that the diaphragm formed a cone about the terminal portion of the esophagus acting as a sleeve. The left crus largely and the right crus to a lesser extent exert pressure on the esophagus at the hiatus and steady it. In cases of visceroptosis the diaphragm has descended and the cone is flattened, thus mobilizing the terminal portion of the esophagus and tending to cause dilatation and cardiospasm. Jackson draws the analogy of the laboratory pinchcock on the rubber tube to the pinchcock action of the crura and explains some of the cases of non-organic stenosis to accentuation of this "pinchcock."

One other effect of the diaphragm should be considered here, namely, the effect on the blood pressure. "Because of the increase in the intra-abdominal pressure the viscera are crowded against the inferior vena cava, blood is forced into the thorax and the immediate effect is that of raising the blood pressure temporarily. Before inspiration is complete the lessened flow tends to decrease the blood pressure. Abdominal respiration produces an initial rise succeeded by a fall in blood pressure during inspiration and an initial fall followed by a rise in pressure during expiration. These results are opposed by the effect on pressure caused by thoracic breathing in which the pressure falls and later rises during inspiration. The effect of combined breathing is the algebraic sum of these opposing influences." (Lemon.)

The nerve supply of the diaphragm is exceedingly important for obvious reasons. Curiously it is not uniformly stated in different anatomies. According to Gray, "the diaphragm is supplied by the phrenic and intercostal nerves."

Deaver[2] states that the nerve supply comes "from the phrenic nerves and lower five or six intercostal nerves. Small filaments are also sent to the diaphragm from the diaphragmatic *(phrenic)* plexuses, which are derived from the semilunar *(celiac)* ganglia and solar *(celiac)* plexus. It should be remembered that section of the phrenic nerve in the neck does not paralyze the diaphragm. The accessory phrenic which comes from the fifth cervical does not join the main nerve until this nerve has passed below the clavicle."

According to Morris, the nerve supply of the diaphragm comes "from the phrenic nerves, one of which arises on each side from the third to the fifth cervical nerves. Each nerve penetrates the diaphragm lateral to the central tendon and breaks up into an extensive plexus on the inferior surface of the muscle. Some of the lower intercostal nerves also contribute to the sensory innervation of the margin of the muscle and possibly also slightly to the motor innervation."

Piersol and also Cunningham attribute the nerve supply of the diaphragm entirely to the phrenic nerves. According to Piersol, innervation is derived "from the third, fourth, and sometimes the fifth cervical nerves, by the phrenic nerves."

Cunningham states that "the diaphragm receives its chief, if not its entire, motor supply from the *phrenic nerves* (C.3.4.5.). It is innervated also by the diaphragmatic plexus of the sympathetic, and is sometimes said to receive fibres from the lower thoracic nerves."

The bulk of independent investigation supports the view that almost the entire motor innervation of the diaphragm comes through the phrenic nerve. Felix in 1923 concluded from his experiments and clinical studies that the motor nerve supply is derived from the phrenic alone. A few motor fibres reach the diaphragm from the twelfth intercostal nerve, but they are not of importance. The muscular tonus of the diaphragm persists only as long as the motor nerve supply is intact. The expansion of the diaphragm persisting after complete motor paralysis of the diaphragm is not due to muscular tonus governed by some special nerve supply but to the action of outside forces—the traction of the lungs, the pressure of the abdominal organs, and the traction of one-half of the diaphragm on the other in cases of unilateral phrenicotomy or blocking of the phrenic nerve.

Schlaepfer in 1923 reported that in experiments on dogs he found that resection of the phrenic nerve on one side caused complete atrophy of the diaphragm on that side. Faradic stimulation of the phrenic nerve on one side caused a prompt contraction of the same side of the diaphragm. Stimulation of the intercostals, the vagus and the anterior roots of the lower thoracic and upper lumbar nerves caused no movement of the diaphragm. Schlaepfer concluded that the phrenic nerve is the only motor nerve for the diaphragm—at least in dogs—and, according to clinical observation, also in man.

Meisezahl in 1925 reported a case in which excision of 34 cm. of the phrenic nerve on the left side was followed by loss of movement and elevation of the diaphragm. The patient died a little over a year later, and at autopsy it was found that the left side of the diaphragm showed complete and uniform muscular atrophy. This finding would seem to indicate that the phrenic is the only motor nerve supplying the diaphragm. Confirmation of this result is found in the experiment published by Schlaepfer.[7]

Through a transpleural approach, the left phrenic nerve in a dog was resected for a length of 1 cm. in its passage over the pericardium, and the experiment terminated two years after this operation. At necropsy the whole left diaphragm formed a loose fibrous membrane contrasting with the muscular right side. As demonstrated by photographs, the muscular atrophy was complete in the lumbar and esophageal portion of the paralyzed diaphragm. A few atrophic muscle fibres were found next to the midline on the paralyzed side in the sternal portion and anterior to the esophagus.

According to Kure, "the diaphragm gets its nervous supply mainly from the phrenic nerve. Besides this, it has the sympathetic innervation coming from the celiac ganglion." The phrenic nerve, he continues, contains non-medullated fibers derived from the cervical sympathetic, especially the stellate ganglion. Thus the sympathetic nerve supply of the diaphragm can be entirely eradicated without impairing the somatic innervation if the stellate ganglion and the abdominal sympathetic are extirpated. On the other hand, the cerebrospinal innervation can be eradicated by severing the roots of the phrenic nerve. In experiments on monkeys, Kure in 1928 found that removal of either the cerebrospinal roots or the sympathetic fibers of the phrenic nerve causes only temporary and slight decrease in the tonicity of the diaphragm. When both are eradicated, the decrease in tonicity is marked and permanent. He concluded, therefore, that both the cerebrospinal roots and the sympathetic fibers participate in maintaining the tonicity of the diaphragm. If one is deficient, the other compensates for it in maintaining this tonicity.

Sensory nerve supply.—The central portions of the pleural and peritoneal surfaces of the dia-

phragm receive their sensory nerve supply from the phrenic, the outer margins from the lower six intercostals. After some ingenious experiments Capps and Coleman[8] conclude that "the peritoneum covering the diaphragm is devoid of pressure sense as applied by light contact or stroking of a beaded wire point. But to strong pressure with a beaded point or light contact with a rough point it is acutely responsive to the sense of pain." Further, they found that "the localization of pain from stimulation of the diaphragmatic peritoneum is never in the diaphragm itself. It is always referred to some distant part. Stimulation of the outer margin causes diffuse pain over the lower costal region and subcostal abdominal wall. Stimulation of the central portion produces pain over a sharply limited point somewhere along the trapezius ridge. These impulses are doubtless carried by afferent fibers of the phrenic nerve to the cervical cord and thence referred to the neck by the sensitized cutaneous nerves of the fourth cervical segment. This pain has not been observed along the course of the phrenic nerve itself."

The diaphragm may be involved in various inflammatory affections, either acute or chronic, subphrenic or supraphrenic. It may be reflexly affected as after operation or spasmodically affected as in hiccough. Its function may be deliberately altered by section of the phrenic nerve. It may be deficient anatomically and allow diaphragmatic hernia to occur. The movements of the diaphragm may be accurately determined by observing Litten's phenomenon, by palpating the costal margins by the method of Hoover or by means of the roentgen ray.

Pain from the affected diaphragm may radiate downwards to the abdomen or upwards to the neck. We are all familiar with the occasional case of pneumonia especially in children in which abdominal pain and rigidity have suggested acute appendicitis and at times the differential diagnosis may be most difficult. A knowledge of the external manifestations of perverted diaphragmatic movement is very helpful in these cases, the evidence of a costal type of breathing, absence of Litten's sign, limitation of movement of the costal margin on the affected side. Sale[9] made an interesting study of the diaphragmatic movements after the onset of acute abdominal symptoms suggesting appendicitis. Flattening of the movement of the right diaphragm was noted in sixteen cases diagnosed and found at operation to be acute appendicitis; in these other cases the sign was positive but the clinical signs obscure; later operation revealed acute appendicitis in all. A negative sign was corroborated in three cases by operation disclosing a normal appendix and in three cases by the clinical recovery of the patient. He quotes Erlanger as stating that as there are no inhibitory fibers in the phrenic, the diaphragm may be mobilized simply in a mechanical fashion through rigidity of the abdominal wall.

Capps[10] made some interesting experimental observations on this point. In cases of pleural effusion he found that pressure excited by a probe on the outer edge of the diaphragm produced painful sensations referable to the lower portions of the thorax, flank or abdomen.

Pain in the shoulder, at the outer border of the trapezius, is well known as a phenomenon attending certain lesions below and involving the diaphragm and here again Capps has added to our exact knowledge. He was able to produce a pneumoperitoneum in patients and under the fluoroscopic screen watch a beaded wire as it was pressed against the diaphragm. Pain in the neck was caused by strong pressure of the wire on the central portions of the diaphragm and in the lower costal and subcostal areas by pressure over the outer portions.

It is well known that subdiaphragmatic abscess produces elevation of the diaphragm and pericardial effusion depresses it. These diseases will not be discussed. In 1916 Pryor[11] called attention to the immobility of the diaphragm following pleural exudates, such as empyema, pleurisy with effusion, and pulmonary tuberculosis with effusion. In about 60 per cent one-half of the diaphragm was completely immobile and in about 20 per cent the excursion was more or less restricted. The observations were made from one month to nineteen years after operation. He seemed to conclude that this condition had resulted "from a gradual paralysis of the phrenic nerve, induced in its course through the mediastinum along the pericardium and phrenico-pericardial ligament to the diaphragm." This region constitutes the point of greatest lateral pressure accompanied by displacement of the heart. The pericardium is held in position below by the diaphragmatic attachment and above by the cervical fascias, the arrangement being much like that of a punching bag. As the heart is pushed and

twisted to the opposite side, the drag and the stretch are applied mostly to the diaphragmatic ligament.

In this connection an interesting study on the conduction of impulses through regions of block of the phrenic nerve by pressure were published a few years ago by Briscoe.[12] She showed that a weight of 400 gm. applied to 4 mm. of nerve will block in 10 minutes and a weight of 80 gm. in one and a half hours. "Since the fibrous tissue or new growth may exert pressure over periods of weeks or months, it may well be that such pathological conditions may block conduction with pressures considerably smaller than those above quoted."

Middleton[13] studied a group of patients to determine the effect of costodiaphragmatic adhesions upon the respiratory function. He concludes from his study that costophrenic synechiæ embarrass respiration to the extent of an average reduction of 32 per cent in vital capacity. This percentage reduction will be favorably influenced by other factors and thus the actual uncompensated decrease greater. He further remarks that the normal diaphragmatic contraction must account for at least 60 per cent of the respiratory interchange in deep breathing. Pryor's conclusion of an actual paralysis of the diaphragm was disproved by the finding of movements of the costal margin toward the midline or no movement whatever upon inspiration.

Matson[14] calls attention to some observations made by him which show that "tenting" of the diaphragm does not necessarily indicate the presence of pleuro-diaphragmatic adhesions. He believes that the "tenting" may be a physical phenomenon brought about by two factors: (a) "During inspiration the diminished elasticity or rigidity of the lower bronchial branches prevents descent of that area of the lung base in immediate relationship to the bronchus involved; thus a dimple effect is produced on the surface of the base of the lung; (b) the diaphragm being molded to the base of the lung by a negative intrathoracic pressure is held by suction in the dimple above referred to, producing a tented appearance (pseudo-adhesion)."

Hiccough is a clonic spasm of the diaphragm, the impulse coming through the phrenic nerves, and occurs in exhausting illness, after surgical operations, from a distended abdomen, from acute indigestion, from reflex causes, as a functional manifestation, etc. An interesting type of hiccough is that seen in the affection commonly called "epidemic hiccough," which, however, seems to have occurred coincidentally with epidemic influenza or epidemics of myoclonic encephalitis. I have seen three cases of post-encephalitic tic of the diaphragm and in all the diaphragmatic spasm was cured by freezing the phrenic nerve in the neck.

The first case was reported in 1925 by Gamble, Pepper and myself[15] and occurred in a man thirty-eight years of age who in November, 1924, had acute epidemic encephalitis. In January, 1925, he first noticed the disturbances of respiration and two months later when we first saw him he was suffering from "dyspnea" as expressed by rapid chest movements following the tic or spasm of the diaphragm and occurring between 60 and 90 times a minute.

"When, under the fluoroscope, the patient was instructed to take a deep breath, the diaphragm could be seen moving in inspiration and expiration, with the more frequent minor contractions of the tic superadded to the larger excursion. When the breathing was not voluntarily controlled, the only motion of the diaphragm was the tic."

Blood chemistry studies were made by Dr. J. H. Austin and he found a shift of the reaction of the blood toward the alkaline side. "These studies confirmed the view that there was overventilation going on as a result of the tic with the synchronous and rapid respiratory movements. The respiratory center was not receiving normal stimuli to respiration and was not sending out strong rhythmic impulses. It seemed possible that there was no actual damage of the respiratory center itself, as might be feared after encephalitis (post-encephalitic respiratory syndrome), but that the respiratory disturbance was wholly secondary to the overventilation induced by the diaphragmatic tic. If this were so, an abolishment of the tic should restore the breathing to normal." Accordingly I exposed and froze the phrenic nerves on both sides and upon recovering from the anesthetic the patient expressed his relief from respiratory distress. "Tracings taken by Dr. Gamble now showed normal respiratory movements, and in the fluoroscope the diaphragmatic movements could not be distinguished from those of a normal person with a small excursion. No tic could be observed. The breath-

ing was apparently normal in every way. The respiratory rate was never rapid. When the breath was held the chest was entirely quiet and none of the jerky movements, which the tic had formerly caused, could be seen. There was no dyspnea or discomfort after climbing three flights of stairs in thirty seconds." The patient was last seen 3 years and 9 months after the operation and had remained well.

The second case occurred in a young girl sixteen years of age and presented similar phenomena except that the post-encephalitic manifestations were more pronounced. She also was relieved by phrenic nerve freezing. The third case presented an unusual feature. The patient was a boy, 22 years old, whose history dated back to November, 1924, and the symptoms were quite vague but suggestive of mild encephalitis. In March, 1925, he developed the dyspnea, which was temporarily relieved by drinking water. As the hyperpnea increased the water drinking increased until at the time when we first saw him, in November, 1927, he was drinking from thirteen to fifteen quarts of water daily. Under the fluoroscope the diaphragmatic movement was normal, the excessive movement not apparent and no evidence of flutter. The phrenic nerves were frozen and thereafter the patient was unable to develop hyperpnea although the polydipsia persisted. After hard work he was reduced to an allowance of 3,500 c.c. of water each day and two months later was still well and trying hard to keep to the allowance. A few days after operation the fluoroscope showed a diaphragmatic excursion of 7 cm. on the right side and 5 cm. on the left.

A case, similar to my first case, was reported by Dowman[16] in 1927 and he quotes Marie as classifying these phenomena into: (1) disturbances of respiration proper, as tachypnea and bradypnea; (2) spasmodic cough, and (3) respiratory tics. Another case has been described by Edie[17] but the phrenics were not blocked and it is stated that the patient received benefit subjectively from luminal.

It is not necessary to dilate upon the treatment of hiccough. In 1921 DeBuen[18] enumerated twenty-three physio-mechanical methods, over thirty drugs and other procedures, all of which had merit. However, there are certain intractable cases, and I have had four such, in which all treatments have failed and direct attack upon the phrenics is justifiable. Goetze[19] in 1920 was the first to suggest injection of the phrenic nerve with novocain for the relief of hiccough. He injected 20 c.c. of a one per cent solution around the nerve and got relief. Fischer in 1923 advised freezing the nerve.

Phrenic nerve interruption as a means of obtaining therapeutic collapse was first proposed by Stuertz in 1911. He practised a simple division. In 1922 Felix proposed the method of radical extirpation or phrenic exeresis which is so commonly done at the present time. The indications for this operation and the discussion of its results have no place in this paper.

The effect of phrenic section on the diaphragm is that of a practically complete paralysis of the side operated upon with ascent of the dome of the diaphragm for a distance of from 4 to 8 cm. on the right and 2 to 6 cm. on the left side. The clinical signs it gives rise to are, "indrawing of the epigastrium with a certain loss of resistance of the abdominal muscles, the affected half of the thorax makes greater excursions, the ribs run less obliquely, the intercostal spaces are broader and the breast stands high on the side which is affected. Litten's sign is absent" (Campbell). Unless the diaphragm is fixed by adhesions or there is a basal pleural effusion, paradoxical movements will be observed. This means that with the downward thrust of the intact diaphragm, intra-abdominal pressure will push the paralyzed side upwards. The affected diaphragm atrophies and eventually becomes a mere membrane. The operation is invaluable in certain types of pulmonary tuberculosis and often useful in bronchiectasis and abscess of the lung.

Eventration of the diaphragm apparently was described first by Petit, who died in 1750 and whose writings were first collected and published in 1774 by Lesue.

Morison[20] states that all of the cases recorded have been on the left side with the exception of one by Eppinger (1911). Morison reports six cases observed by roentgen examination as diagnostic. He notes: (1) the appearance of the upper boundary of the dome as a bow line; (2) the in sac of the stomach in the dome; (3) lung tissue seen through the dome; (4) rotation of the heart; (5) deformity of the stomach, presentation of two sacs, the upper spilling forward into the lower; (6) paradoxical movements. It is interesting to record that in his first case

an operation was performed by Morley, who exposed the diaphragm by the thoracic route. It was incised and then partly excised so as "to bring down its level" and reduce the distortion of the stomach. Three years later the patient was well and suffered no inconvenience. Microscopic examination of the piece of diaphragm removed showed no sign of muscle fibers.

Hernia of the diaphragm is well known and the literature contains many papers bearing on its etiology and treatment. Some difference of opinion has arisen among surgeons as to the best method of approach, through the thorax or abdomen. In 1921 Baker[21] advocated freezing the left phrenic nerve preparatory to radical operation for hernia. He used the thoracic approach. Prompted by Harrington's paper,[22] I recently repaired this hernia through an abdominal approach. With preliminary phrenic nerve freezing and spinal anesthesia the diaphragm was so relaxed that suturing was as easily accomplished as an ordinary skin suture. In the same paper Harrington advocates phrenicotomy as a palliative procedure in certain cases of diaphragmatic hernia in which radical surgical procedures are contra-indicated. Increased intra-abdominal pressure primarily forces the stomach into the thorax, where it is maintained by the suction of the negative pressure in the thorax and the pumping action of the diaphragm. This muscle is then put into spasmodic contraction and cardiospasm or severe shoulder pains are produced. Phrenicotomy checks the pumping action of the diaphragm and by preventing spasmodic contraction relieves pain. The paradoxical movements of the hemiparalyzed diaphragm may lessen the amount of herniated contents.

The diaphragm may be affected by phrenic nerve involvement in the mediastinum from tumor or inflammatory affections. Morison reported nine such cases in which a high diaphragm was found. Necropsy in two of the cases revealed the phrenic nerve involved and some degeneration of the muscle fibers of the diaphragm and he therefore suggests the possibility of an axillary innervation of the diaphragm. However, we might also apply a suggestion of Briscoe that there might be a breaking through of the nerve block by stronger respiratory impulses.

Injury of the brachial plexus in the newborn may involve the phrenic and result in paralysis of the diaphragm. This was first recognized by Kofferath.[23] Dyson[24] has recently reported a case, which was particularly interesting by reason of the paralysis involving the right diaphragm with marked paradoxical movement and by the fact that there was no evidence of other nerve injury. No attempt at nerve repair was advised.

An interesting phase of perversion of diaphragmatic function is that concerning the relation of the diaphragm to hypoventilation of the lung after operations, especially those on the upper abdomen.

Lemon studied the effect of abdominal incisions and major surgical operations on the upper part of the abdomen to note whether the operation caused fixation of the diaphragm, thus contributing to the prevalence of postoperative pulmonary complications. Dogs were used for the experiments and in none was any fixation observed, the excursion being normal and equal to that before operation. Lemon speculates regarding the diaphragmatic movement in man under similar circumstances and states that "the low vital capacity in man is more an expression of abdominal pain preventing resistance to diaphragmatic contraction than to any loss of power in the efficiency of the diaphragm itself." Churchill and McNeil[25] studied the vital capacities in man, as affected by operations on the abdomen. The greatest reduction followed operations on the gall bladder, those on the appendix and for hernia being less marked, and non-abdominal cases not influenced. They believed that the splinting of the muscles is the chief causal factor concerned in the marked reduction of vital capacity, tight abdominal dressings bearing an important part, and posture, distention, fatigue, medication, etc., playing roles of varying importance.

In view of the greater incidence of postoperative pulmonary complications after operations on the stomach, gall bladder, spleen, etc., I conceived the idea that the disease itself was responsible for loss of power in the diaphragm and that such hypofunction was the immediate cause, aspiration into the lungs and bronchi as shown by Lemon[26] being the contributary cause of the pulmonary complication. This was in contravention to the nearly accepted opinion that emboli were the most common excitus of the postoperative pulmonary complication. We were also aware of the statement made by Lee[27] that collapse of the lung in varying degrees always fol-

lows any operative procedure, inhibiting normal respiratory movement by pain or posture.

We studied a group of twenty-five patients who were operated upon for upper abdominal lesions. The actual work was done by one of our Fellows, Dr. R. H. Overholt, and Dr. E. P. Pendergrass supervised the roentgenographic part. Pulmonary symptoms and signs were noted, chest measurements made, vital capacity estimated, and the diaphragmatic movements recorded. At this time I will discuss the latter aspect only. We did not find any evidence of disturbed diaphragmatic function prior to operation, the original starting point of the study. We did find that in nineteen out of twenty-five cases (76 per cent) distinct hypoventilation occurred.

Measurements of the chest in fifteen cases showed a marked reduction in the expansion, from 4 to 5 cm. being the usual finding. Elevation of the diaphragm was seen in all cases, most marked on the right side and especially so in two patients who later developed the signs of massive atelectasis. The maximal excursion of the diaphragm was reduced after operation to a third of its preoperative range of movement. The tidal fluctuations were diminished about one-half.

It was also observed that the position of the tidal fluctuation of the diaphragm varied in regard to its position in the maximum range of excursion. Before operation the tidal movements took place in the lower third of the possible range noted during forced breathing. However, after operation the tidal fluctuations occurred in the upper third of the possible range of movement of the diaphragm.

The comparison of the roentgenograms made before and after operation was perhaps the most striking of all of the observations made in this study. In all of the cases a definite diminution in chest volume was obvious. There was a narrowing of the inter-rib spaces and an elevation of the diaphragmatic domes. The lung markings in only six of the cases were clear. In sixteen of the cases there was a marked intensification of the trunk shadows which produced a triangular area of density in both lower lobes. On the right the cardio-phrenic angle was obliterated. On the left the markings were more or less obscured by the cardiac silhouette. In some of the roentgenograms there are varying degrees of haziness or mottling throughout the entire lung fields.

In the lateral views the appearance was just as striking. The marked reduction in chest volume was clearly evident. The costophrenic angles posteriorly were completely obliterated. The marked diaphragmatic elevation obscures the long detail in the lower lobes. Air can be seen beneath the diaphragm in many of the films. Roentgenograms made preoperatively during full expiration gave similar appearances to the first postoperative day examinations—intensifications of the trunk shadows and alteration in the size of the aerated lung.

The fact that there is hypoventilation of the lungs following upper abdominal operations has been alluded to and commented upon by many writers. However, in this study, the various physical measurements of the respiratory movements demonstrate more concretely the extent of this postoperative depression in pulmonary ventilation. The reduction of 79 per cent in chest expansion and the limitation of 66 per cent of the diaphragmatic excursions would indicate that a great portion of the reserve of the external respiratory forces was lost for a variable period of time following operation. The constant high position of the diaphragm with the tidal fluctuations occurring in the upper third of its possible range of motion illustrates the mechanical disadvantage imposed on the diaphragm after upper abdominal operations.

One of the most interesting and important observations which we were able to make was that the appearance of the base of the lung in hypoventilation presented an appearance similar to that previously diagnosed as a true inflammatory pulmonary lesion, such as a bronchopneumonia, a pneumonitis or a lobular atelectasis. This was checked by Dr. Overholt in an ingenious way. Roentgenograms made before operation of the expiratory phase in which of course there is pulmonary compression, gave a similar appearance to that seen after operation during full inspiration, except that the latter was more marked because the hypoventilation is maintained over a period of time lasting several hours after operation.

There is much opportunity for speculation in these findings but we have reserved this for our other contributions. It is well known that during depressed respiration and particularly when breathing is shallow hypoventilation occurs. Occlusion by bronchial secretions may thus lead to atelectasis. The point is not generally brought

out that the entire respiratory act is depressed, thus lessening the bronchial lumen and favoring the obstruction. A number of our patients were operated upon under spinal anesthesia and these also showed the diaphragm phenomenon described, but I have noted that in these respiration was also depressed. The causal relation of asphyxia to pulmonary congestion no doubt is linked with hypoventilation. At the present time I am under the impression that the irritation of the vagus by the operative manipulations is partly responsible for the depression of the respiratory act. The question of the sympathetic effect on the tonus of the diaphragm needs further study. Certainly the high position of the diaphragm cannot be due to phrenic nerve inhibition. We might think of an increased resistance of the abdominal musculature against the downward thrust of the diaphragm as a factor but clinical observation does not demonstrate that this often occurs.

It will thus be seen that a study of the various phases of diaphragmatic function is worth while and at any rate it stimulates a better understanding of the reasons for the various perversions of its function.

BIBLIOGRAPHY

1. Lee: Am. Jour. Physiol. 1916, 40:446.
2. Neuhofer: Mitteil. a Granzgeb. d. Med. u. Surg. 1922, 3511.
3. Epstein: Am. Jour. Dis. Child. 1922, 34:634.
4. Hoover: Arch. Int. Med. 1913, 12:214; 1917, 20:70.
5. Hoover: Am. Jour. Med. Sci. 1920, 159:633.
6. Mosher: Penn. Med. Jour., 1923, 240.
7. Schlaepfer: Anat. Rec. 1926, 32.
8. Capps and Coleman: Experimental observations on the localization of the pain sense in the parietal and diaphragmatic peritoneum. Arch. Int. Med. 1922, 30:778.
9. Sale: Jour. Am. Med. Assn. 1918, 71:505.
10. Capps: Am. Jour. Med. Sci. 1916, 333.
11. Pryor: New York Med. Jour. 1916, 103:781.
12. Briscoe: Jour. Physiol. 1926, 61:353.
13. Middleton: Am. Jour. Med. Sci. 1923, 166:222.
14. Matson: Am. Jour. Med. Sci. 1922, 163:826.
15. Gamble, Pepper and Muller, G. P.: Jour. Am. Med. Assn. 1925, 85:1485.
16. Dowman: Jour. Am. Med. Assn. 1927, 88:95.
17. Edie: Atlantic Med. Jour. 1927, 30:630.
18. DeBuen: New York Med. Jour. 1921.
19. Goetze: Zentralbl. f. Chir. 1920, 47:1290.
20. Morison: Arch. Radiol. and Electrotherap. 1923, 27:353.
21. Baker: Zentralbl. f. Chir. 1921, 48:554.
22. Harrington: Arch. Surg. 1929, 19:561.
23. Koerath: Monatschr. f. Geburtschlf. u. Gynakol. 1921, 55:33.
24. Dyson: Jour. Am. Med. Assn. 1927, 88:94.
25. Churchill and McNeil: Surg., Gyn. and Obst. 1927, 44:483.
26. Lemon: Arch. Surg. 1926, 12:187.
27. Lee: Ann. Surg. 1924, 79:506.

HERNIA OF THE DIAPHRAGM THROUGH THE ESOPHAGEAL HIATUS WITH REPORT OF NINETEEN CASES*

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EXTENSIVE discussion of the types and classifications of diaphragmatic hernia may be found in medical and surgical textbooks and in numerous papers on this subject. We will therefore not enter into this in detail. The present discussion limits itself to herniation through the esophageal hiatus, which is no doubt the most frequent site of diaphragmatic hernia.

Hernia through the esophageal hiatus has been considered a comparatively rare condition until recently. Schwalbe in 1900 considered it to be very uncommon. Keith in 1910 collected thirty-four cases of diaphragmatic hernia from various pathological collections in London, and only one of these was through the esophageal hiatus. In a monograph in 1911, Eppinger made a very complete review of the literature of diaphragmatic hernia. He collected 635 cases of true and false hernia, and of these eleven were of the para-esophageal type. In 1920, Quenus collected 116 operated cases of diaphragmatic hernia, and only two of these were of the para-esophageal type. In 1924, Carman and Fineman of the Mayo Clinic reported seventeen cases of hernia discovered roentgenologically, and only one of these was through the esophageal hiatus.

More recent work by Åkerlund presents a different angle on this subject. His review of the literature is very complete. He found reports of at least sixty cases of this type. Over a period of five years he collected twenty-four cases himself, sixteen of which he observed personally, while the others were observed by Forssell, Panner, and Simon. Åkerlund now reports that he sees on the average one of these cases per month. He considers this type to be the most common hernia of the diaphragm. A recent report by Healy, presenting fifty-three cases, and our own experience, substantiate Åkerlund's opinion of the frequency of this condition.

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Åkerlund distinguishes three types of hiatus hernia, as follows:

1. Hernia through the hiatus esophageus with congenital shortening of the esophagus, thus making a reposition impossible.
2. Para-esophageal hernia in which the herniated sac lies lateral to the otherwise normal esophagus, which is of normal length and in normal position.
3. Hernia in which the esophagus is not shortened, but in which its distal end constitutes a portion of the contents of the hernia sac.

Åkerlund found the first type to be comparatively rare and classified only nine cases from the literature into this group. He found that these cases tend to show a large portion of the cardia of the stomach in the posterior mediastinum, with bulging into either pleural cavity, more commonly the right. This type is definitely congenital in origin and is non-reducible, owing to the shortening of the esophagus. LeWald calls this type "thoracic stomach" and reports two cases. He considers this to be a congenital anomaly, and that it should not be classified as a hernia. Carman and Fineman's case is also of this type.

The second type is a more common type of hernia. In this type the hernial sac lies lateral to the esophagus, either to the right or left, and occasionally anterior or posterior. The esophagus has a normal linear development. Eppinger thinks that this type is due to a congenital weakness in the muscular ring of the hiatus, and that the hernia develops in the course of extra-uterine life. This type of hernial sac may contain either the cardia or the lower portion of the stomach, as well as the duodenum, other loops of bowel, or the omentum. None of Åkerlund's cases come under this type, but Eppinger reported two cases, and Schwalbe, Manenkow and Legry each report one case under this group. One of our cases (Case 1) belongs to this group.

The third type is closely interrelated with the

Fig. 1, Case 1. Hiatus hernia with gastric antrum and pylorus in hernial sac.

Fig. 2, Case 4. Hiatus hernia with large portion of cardiac end of stomach in hernial sac.

second, varying from the latter in that the distal end of the esophagus lies entirely above the diaphragm, within the hernial sac, where it describes a somewhat tortuous course and shows some dilatation. This group comprises the majority of the reported cases, including all of Åkerlund's cases and all but one of our series. The size of the hernial sac in this group is usually smaller than in the first group, and usually produces no material displacement of the heart.

Many herniæ of the esophageal hiatus are probably purely congenital in origin, being on the basis of a persistent congenital sac, or due to an anomalous condition of the muscular ring. Some may be purely on an acquired basis, the factors being a reduction of the subperitoneal fat, an atrophy of the muscular ring, or stretching of the ring by increased intra-abdominal pressure. One of our cases (Case 1) appears to be definitely related to childbirth, while nine of our cases were in women who had had multiple pregnancies. One was found to have large uterine myomata. One had a very large ovarian cyst. Five cases were associated with a marked increase in intra-abdominal pressure due to ascites and extensive malignancy. Obesity was present in five, and constipation in two cases. This close relationship of many cases to increased intra-abdominal pressure leads us to believe that this is an important etiologic factor. One of our patients had a marked deformity of the dorsal spine and thoracic cage from an old tuberculous spondylitis. Only one case gave a history of severe trauma, but the onset of the symptoms occurred nineteen years after the injury and was related to ascites, so that the injury was probably not a factor. Storonoff and Soresi each report a case where direct trauma to the hiatus was the etiologic factor.

Roentgenologic studies.—Most herniæ through the esophageal hiatus are found accidentally during the course of a roentgenologic study of the gastro-intestinal tract. The diagnosis is rarely made clinically. In several of our cases our attention was directed to this region during the preliminary fluoroscopic study of the chest, namely by a displacement of the heart to the right and by the presence of a mass in the posterior mediastinum, extending to the left of the spine. In these cases as well as in most of the larger herniations a disturbance in the course of the barium mixture is noted during the ingestion of

Figs. 3 and 4, Cases 5 and 6. Small hiatus herniæ, involving cardia of stomach, showing tortuous esophagus and gastric rugæ. Both of these were associated with abdominal malignancy.

the meal. This is not true, however, where the hernia is completely reducible so that there is no abnormal hesitation of the meal at the cardia. When the contents of the hernial sac are adherent above the diaphragm, one may immediately note a torturosity of the lower esophagus, with or without dilatation, and a partial filling of the herniated portion of the stomach.

In the presence of the smaller and of all easily reducible herniæ, there is no abnormality noticeable during the ingestion of the meal. These will, therefore, usually be overlooked by those who fail to examine their patients in the horizontal positions. Several of our cases were partially demonstrated in the vertical position, during the manipulation of the stomach, by forcing the barium mixture upward through the hiatus. The best and most complete demonstration of the hernia can be made in the supine position, while the horizontal oblique positions help to separate the shadows of the esophagus and stomach, and to demonstrate the tortuosity of the esophagus with its termination at the cardia. Occasionally the Trendelenburg position is required to fill the hernial sac. Åkerlund, who has demonstrated a number of smaller herniations, has used a position midway between the supine and the right lateral position. In this position the cardia is the most dependent portion of the stomach, and can thus be completely filled with the barium mixture. Plates are best made in the supine or Trendelenburg position.

To distinguish the type of hernia present it is necessary to establish the relationship of the lower end of the esophagus to the herniated portion of the stomach. This can be readily done in most cases.

One might summarize the roentgenologic findings as follows:

1. Demonstration of a protrusion of a portion of the stomach, with or without the subphrenic portion of the esophagus, through the esophageal hiatus. This may be demonstrated either by air distension, or by filling with a barium suspension, or by a combination of these two methods.

2. Distortion of the lower portion of the esophagus. This may consist of tortuosity with mild dilatation, or of pressure from the herniated mass.

3. Demonstration of the dilatation of the hia-

tus, marked by a wide communication between the stomach and the herniated pouch, with the rugæ of the gastric mucosa extending into the herniated portion.

4. Reduction in the size of the cardiac portion of the stomach, or changes in the contour of the stomach. The gas bubble of the subphrenic portion may be reduced in size, or may be totally absent, and this portion of the stomach is usually displaced medially.

In the differential diagnosis we have to consider eventration of the left dome of the diaphragm, esophageal diverticulum, para-esophageal diverticulum of the diaphragm, diverticulum of the cardia of the stomach, and relaxation of the cardiac orifice of the stomach with dilatation of the subphrenic portion of the esophagus. Occasionally a marked elevation of the diaphragm, producing a tortuosity and dilatation of the esophagus, will present a picture which may be confused with hiatus hernia.

The differentiation can be made in most cases by careful fluoroscopic examination. In eventration of the left dome of the diaphragm one notes an abnormal elevation, but a maintenance of the rounded contour. There is either a greatly diminished response to respiration, a paradoxical excursion, or no excursion at all. The entire stomach will be found under the diaphragm, with upward displacement corresponding to the degree of elevation. The esophagus may be tortuous, but can be traced through the hiatus into the stomach. The stomach will be found in close association with the splenic flexure of the colon which may be demonstrated with barium or may be identified by its gaseous content. The heart is usually displaced to the right.

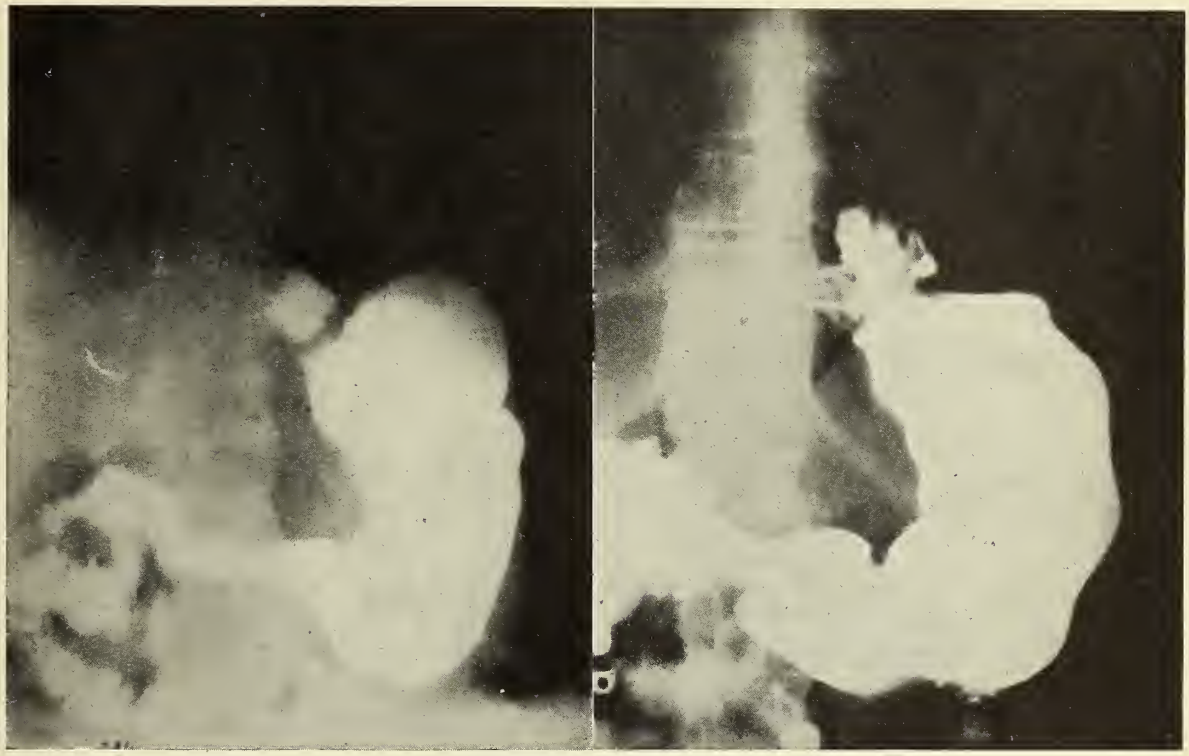
Diverticulum of the lower end of the esophagus or of the adjacent portion of the cardia of the stomach may be differentiated by its subphrenic position, by demonstrating its narrow opening into the esophagus or stomach, and by its rounded contour. It is usually distended with gas, and a fluid level can be demonstrated in the erect position. When such a diverticulum is lodged in a corresponding para-esophageal diverticulum of the diaphragm, as in the cases described by Andrews, Blaker, and Quenus, the roentgenologic differentiation from hiatus hernia is practically impossible. Diverticulum of that portion of the esophagus lying immediately above the diaphragm is comparatively rare, but constitutes a most difficult problem in differential diagnosis. Examination in various positions, complete filling of the sac, and identification of the structures in question should result in a correct conclusion.

With atonicity and relaxation of the cardiac orifice of the stomach, we frequently find a dilatation of the lower esophagus with regurgitation, and this may be most difficult to distinguish from hiatus hernia. The differentiation may be even more difficult where it is associated with elevation of the diaphragm produced by increased intra-abdominal pressure. This may produce a considerable tortuosity of the lower third of the esophagus and thereby present a picture which may closely simulate the smaller herniæ. It should be possible, however, to demonstrate the absence of an actual sac, the subphrenic position of the cardiac orifice, as well as the lack of the characteristic distortion of the stomach.

The symptoms produced by hiatus hernia vary with the type and with the size of the hernial sac, and with its contents. The smaller herniæ are usually not the source of any marked distress. The larger herniæ may produce substernal or epigastric pain. This is the most common symptom mentioned in the literature. Åkerlund found it in sixteen of his cases, but a number of these had other findings which might account for the pain. In our series, eleven complained of epigastric pain or distress, with other pathologic conditions to account for the pain in four cases. One of our cases, in which an obstruction of the pylorus was produced by herniation, suffered periodic attacks of severe pain accompanied by vomiting. Another case experienced distress only when lying on the back or right side. Examination of this patient revealed herniation in these positions, but complete reduction of the hernia in the erect position.

Nausea and vomiting occurred in six of our cases, and is frequently reported in the literature. Belching was also present in six cases. Dysphagia occurred in three, and pyrexia in two cases. Alkalies gave relief from the pyrexia.

The treatment of hiatus hernia is predominantly surgical. The abdominal approach is more advantageous, especially where the content of the hernial sac is readily liberated. The hernial sac is obliterated, if possible, or the communication between the peritoneal cavity and the sac is closed, with a repair of the hiatus. If the con-



Figs. 5 and 6, Case 11. Fig. 5 shows hernia before manipulation. Fig. 6 shows same case after manipulation, demonstrating variation in size of the hernial sac. This figure also demonstrates the gastric rugæ extending into the herniated portion of the stomach.

tent of the hernia is adherent, the transpleural route is indicated. Three of our cases submitted to surgical repair. One of these (Case 1) died of peritonitis. The second case (Case 12) survived the operation, but without relief from symptoms. Subsequent roentgenologic examination revealed repair of the hernia but with still some dilatation of the lower esophagus. Still later examination revealed a recurrence of the hernia. The third case (Case 11) made an uneventful recovery. Later findings in this patient are described under detailed case report. A phrenicotomy was performed in another case. There was no apparent immediate relief. Some months later the patient was put to bed for several weeks, which resulted in a marked improvement in her condition.

Medical treatment consists of dietary measures and of attempts to avoid exacerbation of the condition. Mild laxatives may be indicated to avoid abnormal exertion during defecation. Other forms of excessive exertion must be avoided. Soft foods are indicated to avoid irritation of the lower esophagus and of the cardia, and this is especially true where dysphagia is a prominent symptom. Rest in bed with a liquid diet may be necessary temporarily if dysphagia becomes marked. If the symptoms are associated with certain positions, postural treatment is indicated.

We are reporting herewith nineteen cases of hernia of the esophageal hiatus. In this series there are fifteen females and four males. The age incidence is from 40 to 75, with an average of 58.

In reporting these cases, the authors acknowledge the courtesy and assistance of Drs. H. L. Ulrich, J. D. Lyon, Macnider Wetherby, M. H. Nathanson, and Kenneth Phelps.

Case 1.—B. S., female, age 45, widow. The patient was admitted to the Minneapolis General Hospital September 25, 1928, with the complaint of pain in the epigastrium and vomiting. Her present illness began September 20, 1928, when, shortly after a meal, she was seized with a severe pain in the epigastrium which was soon followed by vomiting. The pain was sharp and shooting in character with a constant feeling of heaviness. Emesis gave temporary relief. She expelled all food taken subsequently, and all food intake brought on an attack of pain.

The patient stated that she had had an attack similar

to the present one some twenty-one years ago, four days after her first childbirth. That attack lasted only a few hours. On the eleventh day after that childbirth she had had a second attack which was also readily relieved. There had been no further attacks until about a year ago, when she had several mild attacks of a similar nature. She had gone through three subsequent pregnancies without any trouble.

The patient was very obese. There was some tenderness in both upper quadrants and in the epigastrium. The physical examination was otherwise negative.

Clinical impression: Chronic cholecystitis.

Roentgenologic examination (Oct. 3, 1928): Fluoroscopic examination of the chest reveals a rounded area of translucency at the left lung base and posterior to the cardiac shadow. This is about the size of a large orange. The lower esophagus is markedly displaced toward the right and lies in close association with this mass. It passes through the hiatus and its subphrenic portion terminates in normal position at the cardiac orifice of the stomach. The cardiac portion of the stomach is in normal position and is not reduced in size. The stomach is somewhat dilated and has the appearance of a large rounded ball. The antrum of the stomach points upward toward the diaphragm. The pylorus and duodenum cannot be demonstrated in the erect position. In the supine position the area of translucency in the posterior mediastinum becomes filled with barium. The antrum of the stomach is pulled up into this region. The barium passes in very small quantities into the duodenum, which extends into the region of the hiatus. The duodenal bulb cannot be demonstrated. The entire study indicates a herniation of the antrum, pylorus and duodenal bulb through the esophageal hiatus. In the erect position the herniated portion of the stomach does not remain filled, but the hernia is not reduced. At the six hour examination there is still about 90 per cent of the barium retained in the stomach, and eleven days later there is still about a 30 per cent retention.

Conclusion: Hernia of the gastric antrum, pylorus and duodenal bulb through the esophageal hiatus, with subtotal obstruction (Figs. 1 and 7).

On a liquid diet the patient ceased vomiting and the liquids apparently passed the pylorus although the heavier barium passed only very slowly. The patient refused surgery and was discharged from the hospital on Oct. 20, 1928.

On Feb. 6, 1929, she returned to the *x*-ray department for re-examination. At this time the entire cardiac portion of the stomach, including the lower end of the esophagus, was herniated through the hiatus, while the antrum and pylorus were in normal position. A distinct change had therefore occurred and the Type II hernia had become a Type III. Further study on Feb. 18, 1929, revealed a recurrence of the herniation of the antrum through the hiatus, with the cardia again in normal position.

The patient submitted to surgery on Feb. 26, 1929. A marked dilatation of the hiatus was found. This was large enough to admit the surgeon's entire hand. The entire stomach was herniated through this opening. The operative procedure consisted in replacement of the stomach into the abdominal cavity, with repair of the hernial opening, and fixation of the stomach against the abdominal wall. The gallbladder was found full of stones, and was removed. During its removal it ruptured with some contamination of the peritoneal cavity. The patient developed peritonitis, and died about two weeks postoperatively. A postmortem examination confirmed the previous findings.

This case is the only one in our series of Type II of Åkerlund's classification, although at one examination it temporarily changed into Type III. All of our other cases are of his Type III.

Case 2.—B. R., female, age 65, married, four pregnancies. The patient was first seen by Dr. M. H. Nathanson in December, 1927. For several years she had suffered considerable pain and the sensation of pressure in the epigastrium. This was intermittent in character. She also complained of a choking sensation associated with the epigastric pain.

The patient was short in stature and moderately obese. The physical findings were essentially negative. Roentgenologic examination by Dr. Nathanson in December, 1927, revealed the abnormality of the cardia, but because of the persistence of the symptoms she was sent to us for further confirmation of the diagnosis.

Roentgenologic examination (April 12, 1928): The esophagus is markedly tortuous in its lower third, and opens into a portion of the stomach which is herniated through the esophageal hiatus. This is about the size of a large orange. It shows a considerable amount of gas and a fluid level within it, and does not empty completely even in the erect position. It connects with the subphrenic loculus by a rather narrow channel. The subphrenic loculus is considerably distorted with a comparative reduction in the size of the cardiac portion and a displacement medially by the tension toward the hiatus. The stomach is otherwise normal.

Conclusion: Hernia of the cardia of the stomach through the esophageal hiatus.

The patient was next referred to surgery for treatment. A phrenicotomy was done in order to relax the left dome of the diaphragm. This gave no apparent relief. In July, 1928, she was placed on bed rest for several weeks, during which time the symptoms improved markedly. Dietary measures were also instituted. The patient is now relieved of practically all of her previous symptoms.

This case illustrates a type in which there is a rather large hernial pouch which produces marked symptoms. Cases 3 and 4 are of a similar nature and will not be recorded in detail. Case 3 demonstrated a fairly large reducible hernia which produced symptoms only in the horizontal position.

Case 5.—C. O., female, age 69, married. The patient was admitted to the Minneapolis General Hospital on

May 24, 1927. She complained of pain in the left upper abdomen, abdominal distension, nausea and vomiting. These symptoms had been of four weeks duration, and had been preceded by indefinite malaise, with some pyrosis. Emesis had been persistent since its onset. There was no weight loss. Diarrhea had been present for two days before admission.

The past history was essentially negative except for a fall down a stairway at the age of twenty, resulting in fracture of ribs. There had been one pregnancy.

The predominant physical finding was a marked ascites. This was relieved by repeated paracentesis. The fluid was found to be a transudate which contained numerous small cystic bodies measuring 8 to 9 mm. in diameter. Microscopically these showed an epithelial lining with loose connective tissue stroma, suggestive of cystic carcinoma of the ovary.

Roentgenologic examination (May 25, 1927): The esophagus is moderately dilated and markedly tortuous in its lower third. There is protrusion of the cardiac end of the stomach through the esophageal hiatus into the posterior mediastinum. The terminal end of the esophagus lies about two inches above the diaphragm. The herniated portion of the stomach is about the size of a hen's egg. It is somewhat angular in outline, and communicates freely with the subphrenic loculus through a greatly dilated hiatus. The gastric rugæ can be clearly traced into the upper loculus. The portion of the cardia below the diaphragm shows a marked diminution in size as compared to the normal, with considerable displacement toward the midline. The hernial sac remains fixed in the posterior mediastinum indicating that it is adherent.

Conclusion: Hernia of the cardia of the stomach through the esophageal hiatus (Figs. 4 and 7).

An exploratory laparotomy revealed extensive carcinomatosis of the peritoneal cavity. The left fallopian tube was thought to be the site of a primary adenocarcinoma. The patient died on October 19, 1927. Autopsy examination was made by Dr. C. J. Watson. The extensive carcinomatosis was again demonstrated. The esophageal hiatus was studied. It was found to be about twice the normal in size, with herniation through it of the lower end of the esophagus and of a loculus of the stomach. These were adherent in the posterior mediastinum and could not be replaced into the abdominal cavity. The layers of the hernial sac were not studied microscopically.

This case is associated with increased intra-abdominal pressure, which probably bears a definite etiologic relationship to some forms of hiatus hernia. Cases 6, 7, 8, 9 and 10 are of similar nature and are not described in detail. All of these five cases died from the effects of intraperitoneal malignancy.

Case 11.—T. O., female, age 56, married, eight pregnancies. The patient was admitted to the Minneapolis General Hospital on March 26, 1929, complaining of lower abdominal pain, with recent nausea and vomiting. She got relief from belching and from lying on her right side. She had qualitative and quantitative food distress. She was markedly constipated. An inguinal hernia had been repaired six months previously.

Physical examination revealed lower abdominal tenderness which seemed to be diffuse. There was a mild secondary anemia.

Roentgenologic examination (March 29, 1929):

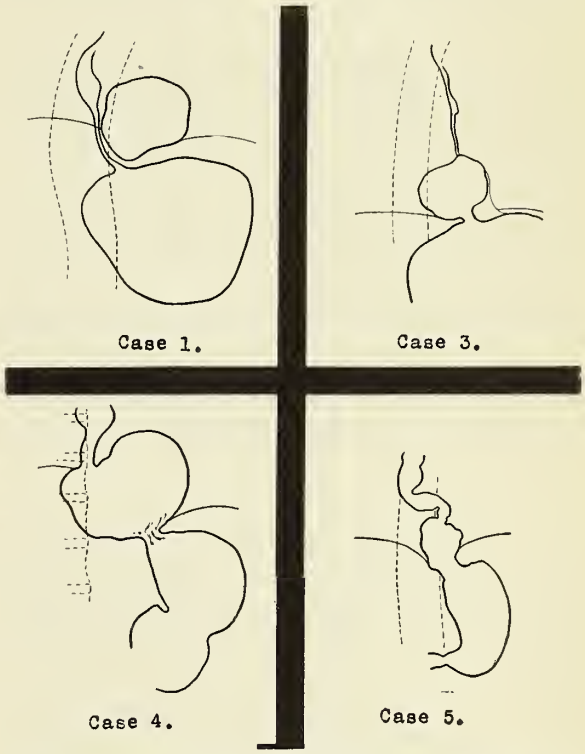


Fig. 7. Diagrammatic tracings of four cases of hiatus hernia. Cases 1, 4 and 5 are also illustrated in Figures 1, 2, and 4, respectively.

There is a relaxation of the esophageal hiatus with herniation of the cardia of the stomach through the hiatus into the posterior mediastinum. The lower esophagus is tortuous and somewhat dilated. The hernia is reducible in the erect position. In the prone position it at first is about the size of a walnut, but on manipulation can be enlarged to the size of a small orange. The gastric rugæ are demonstrated extending into the herniated sac. The subphrenic portion of the stomach is displaced medially. The stomach is otherwise normal. The colon shows multiple diverticuli throughout its extent. Examination of the gallbladder by the Graham-Cole method demonstrates normal function and evidence of pericholecystic adhesions.

Conclusion: 1. Hernia of the cardia of the stomach through the esophageal hiatus. 2. Diverticulosis of colon. 3. Pericholecystic adhesions (Figs. 5 and 6).

The patient submitted to surgery. The multiple diverticuli of the colon and the pericholecystic adhesions were demonstrated. The esophageal hiatus was found to be dilated to a diameter of about one inch with a hernial pouch extending through it into the posterior

mediastinum. The opening was repaired and the cardia of the stomach was fixed to the parietal peritoneum. The postoperative course was uneventful.

Later examination revealed a small traction diverticulum of the lower portion of the esophagus just above the diaphragm. The cardiac portion of the stomach was now in normal position, but showed an hourglass constriction. This was interpreted to represent the site of the previous constriction of this portion of the stomach at the hiatus.

This case illustrates a smaller type of hernia which is usually associated with rather indefinite epigastric distress. In these cases the hernia is frequently reducible, and is usually not demonstrable in the erect position. Filling of the hernial sac is produced in the supine or prone position. The presence of inguinal hernia and of colonic diverticuli adds interest to this case, and points toward the congenital origin of these herniæ. Cases 12, 13, 14, 15, 16, 17, 18 and 19 are very similar to the above described case, and the details of these cases are therefore omitted.

SUMMARY

1. A group of nineteen cases of hernia of the diaphragm through the esophageal hiatus is reported, and the detailed clinical and roentgenologic findings in four representative cases are given.

2. Hiatus hernia has been considered an infrequent condition until recently. Our own experience substantiates that of Healy, Åkerlund, and others, that this is a comparatively common condition, and that it is far more frequent in occurrence than all other types of diaphragmatic hernia.

3. Hiatus hernia is rarely diagnosed clinically. The symptoms are usually vague, and often point toward other types of pathology.

4. Roentgenologic examination is the usual method of establishing this diagnosis. A careful fluoroscopic study with the aid of an opaque meal must be made. The patient must be examined in various positions, as use of the vertical position only will frequently result in overlooking this condition.

5. Hiatus hernia must be differentiated from (a) eventration of the left dome of the diaphragm, (b) esophageal diverticulum, (c) paraesophageal diverticulum of the diaphragm, (d) diverticulum of the cardia of the stomach, (e) relaxation of the cardiac orifice of the stomach with dilatation of the subphrenic portion of the esophagus, and (f) tortuosity and dilatation of the esophagus produced by elevation of the diaphragm due to increased intra-abdominal pressure. The differentiation rests entirely on the roentgenologic observations.

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BIBLIOGRAPHY

1. Åkerlund, Åke, et al: Hernia Diaphragmatica Hiatus Oesophagei. Acta Radiologica, Vol. 6, Fasci. 1–6.
2. Carman, Russell D., and Fineman, Solomon: The roentgenologic diagnosis of diaphragmatic hernia, with a report of seventeen cases. Radiology, July, 1924, 3:26.
3. Healy, Thomas R.: Symptoms observed in fifty-three cases of non-traumatic diaphragmatic hernia. Am. Jour. Roentgenol., 1925, 12:266.
4. LeWald, L. T.: Thoracic stomach. Radiology, 1924, 3:91.
5. LeWald, L. T.: Roentgenological diagnosis of diaphragmatic hernia. Am. Jour. Roentgenol., 1928, 20:423.

THE AFFERENT NERVE SUPPLY OF BLOOD VESSELS*

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SINCE the introduction of dissection as a means of studying the mechanisms of the body, it has been common knowledge that the blood vessels are richly supplied with nerves. Their function, however, was totally unknown—one might even say unsuspected—until Claude Bernard[1] in 1852 coincidently with Brown-Sequard[2] made his startling discovery that section of the sympathetic nerve in the neck of the rabbit caused dilatation of the vessels in the corresponding ear. This demonstration of a nervous control of blood vessels started a vast amount of research upon this interesting and very important subject, research which has resulted in an immense literature and a definite knowledge of the motor control of blood vessels. However important the vasomotor system may be, it is only one-half of the reflex arc which causes the reaction to appear. Although a large amount of work has been done upon vascular reflexes arising from extra-vascular sources, yet the afferent paths from the vessels themselves have been studied very little.

Probably the first important work upon this subject was done by Heger[3] in 1887. Working upon the vessels of the hind limb, he discovered that excitation of the internal surface of the blood vessels can cause a general change in the circulatory conditions at a distance. He stated that it was a reflex phenomenon set up by the stimulation of sensory nerve endings in the vessels themselves. Chemical stimulation of the vascular endothelium in his experiments gave most often a rise of general blood pressure accompanied by a slowing of the heart, and only exceptionally did he get a lowering of the blood pressure. This work was not repeated until 1896, when Spallitta and Consiglio[4] confirmed his results, and added the very interesting information that not only chemical stimuli but also "simple oscillations" of the blood pressure could put this reflex pathway into activity. These results were in turn confirmed by Delezenne.[5] Pagano[6] in 1900 found that the carotid and vertebral arteries respond with general blood pressure and respiratory changes to injections into them of prussic acid and nicotine. The Swedish surgeon, Lennander,[7] studied local anesthesia and the sensitivity of organs in 1901. In 1922 Odermatt[8] in a lengthy paper discussed this problem and came to the conclusion that irritating chemical substances injected into the blood stream cause blood pressure changes and pain only when they reach the capillaries, while the arteries and veins do not respond to such stimuli, but do respond to stretching of their walls or manipulation in the same way. He further adds that this sensation from the arteries and veins is due to the periarterial plexus of nerves in the adventitia, and is lost upon destroying these nerves (as by periarterial sympathectomy). Ranson, Windle, and Faubion[9] in 1923 assumed a reflex excitation of the respiratory center through sensory nerve endings in the vessel walls to explain the immediate increase of respiratory rate after the intra-arterial injection of ether. Freidrich,[10] in reporting a case in which pain in the hand was relieved by periarterial sympathectomy after section of the three arm nerves had failed to cure it, said that in dogs under partial anesthesia injection of 50 per cent lactic acid into the femoral artery caused pain, but not if the artery was ligatured above the site of injection. He concluded that there are nervous paths in the arterial walls which conduct impulses producing pain.

In opposition to the ideas presented by previous authors, Dennig,[11] in 1924, found no sensory nerves in the adventitia of the femoral arteries in dogs. In 1925 the same author[12] claimed that there are no indications of long sensory nerves in the adventitia of arteries, and furthermore that lactic acid causes pain if the adventitia is removed without ligation of the artery.

This observation lends weight to the most evident criticism of all the previous experiments. Those experiments were carried on in the intact animal, and the injection was made into arteries that were not isolated from the general circulation. Thus the possibility of direct stimulation

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of the vasomotor center was excluded only by the assumption that the time that elapsed before the appearance of symptoms (10-12 seconds) was too short for the circulation to have carried the injected substance that distance. As a matter of fact, the time required for blood to circulate through the body is very short, and the exact time necessary for the blood to flow from one certain part to another cannot be predicted with any degree of accuracy.

However, the general trend of opinion seems to be that there are sensory nerves in the walls of arteries and veins and around capillaries which respond to stimulation with pain and blood pressure changes.

This conclusion is borne out by clinical experience. Operations performed under local anesthesia point in some cases to sensory endings in the blood vessels responding to manipulation with the sensation of pain. Bier,[13] before Lennander, showed that ligation of the mesenteric arteries is painful. Hotz[14] said that an increased novocaine concentration caused pain in arterial anesthesia. Ligation of arteries often causes pain. In insufficiently anesthetized patients in goiter operations, ligation of the superior thyroid artery often causes pain, while ligation of the inferior thyroid never causes pain. Ligation of the four main arteries of the stomach is painful under local anesthesia. In addition to the above, Odermatt states that pain is caused by arterial and intravenous injections, injury to vessels and traumatic aneuryism, thrombi, emboli, arteriosclerosis and other vessel diseases, and by vessel cramp. Hess and Konigstein[15] say that changes in the fullness of the vessel are frequently accompanied by pain.

Clinical relief of pain in various arterial diseases by periarterial sympathectomy, first introduced by Leriche, also points to pain conduction by the arteries. Cain and Hamburger,[16] Freidrich,[10] Leriche,[17] G. E. Brown,[18] and many others have reported relief of pain in Raynaud's disease, thrombo-angiitis obliterans, and related vascular affections, after periarterial sympathectomy or after lumbar sympathetic ganglionectomy in conjunction with that operation. In one case, the severe and uncontrollable pain of angina pectoris was immediately stopped by cervical sympathectomy. These results might be taken to point toward the conduction of pain along the arteries, but they are also amenable to another explanation, that is, that the pain is caused by the anemia of the parts affected, and the relief was gained, not by sectioning the sensory nerves carrying the impulses, but by the increased vascularity of the region after the operation. In the main, however, clinical experience may be said to uphold the idea that sensory nerves are present in vessels, at least at certain places. These might give rise to vascular reflexes.

An examination of the blood vessels histologically in respect to their nerve supply is very illuminating. It has long been known that the arteries are well supplied with nerves. The existence of vasoconstrictor nerves in all organs of the body except the lungs, brain, heart and voluntary muscle has been proved beyond any shadow of a doubt (Bayliss[19] 1923). Bradford and Dean[20] in 1894 showed that the lungs were supplied with vasomotor nerves. Some doubt was cast upon the existence of vasomotor nerves in the lungs by later work, especially that of Brodie and Dixon[21] in 1904. However, Fuhner and Starling,[22] in 1913, settled the question when they showed that adrenalin constricts the branches of the pulmonary artery. The cerebral circulation was found by Bayliss and Hill[23] to be controlled only by the general arterial and venous pressures. Later workers, by staining methods, have shown the presence of nerve fibers in the blood vessels and pia of the brain (Obersteiner[24] 1897, Morison[25] 1898, Huber[26] 1899, Rohnstein[27] 1900, Hunter[28] 1901). However, they had no definite means of deciding upon their function. They may be either sensory or motor. It seems very unlikely that the heart is supplied with vasomotor fibers (Markwalder and Starling[29] 1913). Evidence has been brought forth to show the existence of vasoconstrictor fibers in striated muscle by Gaskell.[30] His experiments were confirmed by Hartman, Blatz and Kilborn.[31] But the evidence is not conclusive enough to say that the question is decided (Bayliss[19] 1923).

Since the introduction by Leriche[17] of his periarterial sympathectomy in which he removes the adventitia of arteries in order to relieve vasomotor diseases, there has been done a good deal of work to explain the varied results of this operation. Nerve plexuses have long been known to exist around arteries and veins. Berglas,[32] with a binocular microscope, "was able to dissect the periarterial plexus around such vessels as the iliacs, where he always found large nerve strands at the union of the adventitial and mus-

cular coats." He believes that this plexus extends along the whole vascular tree and that it is everywhere continuous. Periarterial sympathectomy would effectively remove this plexus. However, physiological experimenters, especially Langley,[33] Wiedhoff,[34] and Schlif,[35] have found that in animals the normal vasomotor reactions are not destroyed by this operation, while, if the main nerves to the limb are cut, those reactions are lost. Woollard[36] in some very careful histological work explains these results very satisfactorily. He studied whole preparations of such small animals as the rat and guinea-pig and was thus able to "examine the innervation of the vessels in unbroken continuity." In addition he removed the abdominal sympathetic chain on one side in some cats and allowed the nerves to degenerate; while in other cats he removed the adventitia from the common and external iliac arteries on one side and allowed these nerves to degenerate. The conclusions to which his experiments led him are very interesting. He found that the "limb vessels are innervated proximally by nerves derived directly from the aortic plexus, and distally by contributions from the adjacent nerve trunks." That is, he found that above the bifurcation of the femoral artery the nerve supply consists almost entirely of non-medullated nerve fibers (considered not to be sensory) derived from the sympathetic plexus around the aorta. Distal to the bifurcation of the femoral a second mode of innervation adds itself to the first. It consists in many nerve fibers, usually too small to be seen grossly, which run into the periarterial plexus and fuse with it. These fibers are largely medullated (at least four to one). Thus part of the distal innervation of the arteries is derived from the ordinary somatic nerves, and these nerves may be sensory. He further describes medullated nerves which send branches both to the blood vessel wall and to the surrounding fat and connective tissue. These may form a neural basis for the axon reflex. In the capillaries, however, he did not find a complete innervation. Sympathetic fibers were found at various parts, but there was no evidence of innervation by medullated nerves. However other authors have reported the presence of abundant nerve fibers around the capillaries. Dogiel[37] has described terminal nerve plexuses around capillaries and small blood vessels. Yet it is not certain whether his work was really upon capillaries or merely upon small arterioles. Shafer,[38] however, states that "gold impregnation of the rabbit's mesentery shows every capillary to be supplied with a nerve running along it, the nerves forming loops." Thus there is found to be a very definite histologic basis for vascular reflexes, both the sensory and motor pathways being potentially present.

Vascular reflexes arising from the smaller vessels are still problematical, but other types of reflexes affecting the blood vessels are well known. Vascular reflexes may be divided into two classes, those with the sensory stimulus arising from extravascular structures, and those with the sensory stimulus arising from the vessel itself. The most important examples of the first type are the following. It is well known that stimulation of the central end of any cutaneous nerve will cause an immediate rise of blood pressure under most circumstances. Thus it is evident that cutaneous stimulation or in fact any stimulus that would cause pain will affect the vasomotor center as well as the respiratory center. Pressor responses may also be elicited by stimulation of visceral nerves, or by an insufficient blood supply to the brain. The axon reflex of Langley may be mentioned here although it is not a true reflex. It has been suggested by Bayliss[39] that this reflex is brought about by stimulation of a sensory nerve which causes dilatation of the blood vessels of the region by a peripheral nervous mechanism. This has been shown to be accomplished by an axon which has two collateral terminations, one going to the skin and the other to the blood vessel. Ninian Bruce[40] brought forth experimental evidence in support of this view. He found that the application of oil of mustard to the skin caused a vasodilatation even if the nerve had been recently cut, and therefore the effect could not be a spinal one as Spiess[41] had thought. These observations have been borne out by histological studies.

There are only two definitely proved examples of the second type. They are the depressor reflex and the carotid sinus reflex. The depressor nerve was first discovered by Cyon and Ludwig[42] in 1866. In the rabbit it is a small nerve arising from the base of the aorta, as shown by Koster and Tschermack,[43] and running near the vagus but separate from it. In other animals it is probably incorporated in the vagus nerve. If this nerve is cut there is no response upon stimulating the peripheral end, but stimulation of the central end results in an immediate and very

marked fall in the blood pressure. This fall has been shown by Bayliss[44] to be due mainly to dilatation of the splanchnic vessels, but also, in part, due to a general vasodilatation throughout the entire body. The normal stimuli for this reflex are supposed to be blood pressure changes in the aorta. Therefore this constitutes a true vasovascular reflex. The carotid sinus reflex was first demonstrated by Sollmann and Brown[45] in 1912, who found that traction upon the cephalic end of the carotid artery produced a reflex fall of blood pressure. They found the effect to be due almost entirely to a slowing of the heart. Vasodilatation plays little or no part. At the same time they were unable to locate either the afferent or the efferent path, for section of the vagus nerve did not interfere materially with the reflex. Hering,[46] however, in 1924 traced this reflex to a branch of the glossopharyngeal nerve which he calls the sinus nerve. He says that stimulation of the central end of this nerve causes a greater lowering of the blood pressure than does the stimulation of the depressor nerve. These are, then, true vascular reflexes such as we have been discussing. Their function is evidently that of controlling the blood pressure to prevent damage to the vascular system in case the pressure should become too high, as well as to regulate the normal blood pressure. On considering other protective mechanisms in the body, it becomes evident that they are reduplicated time and again in various places so that there may be as little likelihood as possible that the body will be caught unprepared. Especially in the blood vascular system, the single system most essential to life, would one expect such precautions. Another very likely function for such a vascular reflex mechanism would be the regulation of blood pressure in the various parts and the coördination of general blood pressure to their needs.

Briefly summarizing the present status of this question of sensory nerves from blood vessels, one would say that the evidence points toward the presence of sensory fibers from the capillaries which respond to chemical substances in the blood-stream, and the presence of sensory fibers from the larger vessels which respond to pressure changes and manipulation. Histologically this idea is borne out except that the largest vessels, that is, above the bifurcation of the femorals, may have no sensory fibers. In addition, microscopic study shows that the paths of these fibers are largely through the peripheral nerves. This conception, however, has never been proved conclusively. The experimental work is very difficult to interpret. Since this is a very important physiological mechanism, it seemed advisable to investigate the possibility of such reflex pathways experimentally.

EXPERIMENTAL WORK

A series of preliminary experiments was carried out along the line of investigation used by the older experimenters, that is, by the use of irritating substances injected into the arteries and veins. This method of procedure was found to be unsatisfactory because of the inconstancy of the results, and because of the multitude of uncontrollable factors that made the results unreliable and their interpretation difficult. Therefore it was decided to conduct experiments using pressure changes within the vessel as the stimulus.

To this end the following apparatus was evolved. A mercury manometer was connected with a three-way tube. From one arm of this tube a length of rubber tubing led to an ordinary automobile tire valve arranged so that an automobile tire pump could be connected to it. From the other arm a tube was connected to a metal tube 1.5 to 3 millimeters in diameter. This was soldered at one end, but had an opening two inches from that end. Near the tip of this metal tube a circular indentation was made and about four inches from this another groove was made around the tube. A piece of fine tissue drainage tubing was then stretched over this portion of the tube and was tied with thread at the groove, making a long balloon. Thus, a stroke of the pump would distend the balloon and at the same time cause the mercury in the manometer to rise and measure the pressure. The manometer was three feet tall, so to write the pressure upon the revolving drum, a volume recorder was connected to the manometer, and the pointer of the volume recorder was adjusted to write upon the drum. The scale of reduction was then determined by actual measurement at different pressures. The balloon was inserted into the artery or vein that it was desired to study.

With this apparatus it was possible to have a definite measured pressure as high as seven hundred millimeters of mercury in the artery, and at the same time have this pressure written upon

the drum. The balloon did not burst under these pressures because the artery or vein acted as an outer casing exactly like an automobile tire. Several of these balloons could be connected to the same pump to study the effects in various places.

EXPERIMENTAL RESULTS

These experiments were carried out upon dogs. It was found to be necessary to use dogs weighing thirty-five pounds or more so that the arteries would be large enough to receive the balloon easily. The experiments were carried on without the use of morphine. The only substance used which would tend to deaden the reflexes was the ether which was used for the anesthetic. In one dog this was dispensed with by decerebrating and allowing time for the ether to be eliminated from the body (two and one-half hours). Indeed, two of the dogs were made hyperirritable by the injection of 3 cubic centimeters of a four-one hundredths per cent solution of strychnine sulphate. This procedure caused such a tremendous hyperirritability that merely touching a finger to the skin over the sternum would cause a reflex rise of blood pressure. This injection of strychnine was given to eliminate the least trace of suspicion that the dogs were in poor condition and that the uniformly negative results might be due to a lowered irritability of the animal rather than to an absence of nerve endings, which would respond with reflex blood pressure changes to distention of the vessel walls. In the other dogs it was considered unnecessary to inject strychnine because, in those dogs, the carotid artery was used, which gave a marked fall of blood pressure upon distention. This was believed to be sufficient indication that the reflexes were working properly. However, in all these dogs, the irritability was controlled very carefully by stimulation of the femoral or sciatic nerves electrically. This was done to afford a means of comparison between the reactivities of the various dogs as well as to prove that the normal blood pressure reflexes were in good condition. This stimulation was accomplished with an ordinary induction coil with the secondary coil set at eight centimeters. The source of electricity consisted of two dry cells. The nerve was stimulated by means of a Sherrington electrode in the case of the sciatic nerve and by merely laying the nerve upon electrodes with the femoral nerve. The nerves were stimulated at intervals throughout the experiments. Stimulation usually caused an immediate rise of blood pressure followed by a drop to below normal, after which recovery to normal occurred. The relative irritability as shown by nerve stimulation is brought out clearly by the accompanying table.

TABLE I

	NERVE STIMULATION		
Dog No.	Nerve	Av. Rise of Blood Pressure	Av. Fall of Blood Pressure
1	Femoral	12.3 mm. Hg.	7.7 mm. Hg.
2	Sciatic	15.	15.
3	Sciatic	16.6	24.2
4	Femoral	6.	13.

Table I shows that the dogs were irritable.

The balloons were inserted into the vessels of these dogs in much the same manner as cannulæ. The vessel was cleaned and ligatured away from the site of insertion. A clamp was then placed on the side of the vessel in which it was desired to insert the balloon. A loose ligature was placed around the vessel and the vessel was nicked. The balloon was entered into the vessel, the clamp was removed and the balloon pushed into the desired position. The loose ligature was then tied tightly to prevent loss of blood and to hold the balloon in place. In this way, the balloon was placed ten to twenty centimeters away from the point of operation. Thus the nerve supply was not disturbed in the region of the balloon. The femoral artery or vein was entered in the middle of the thigh, and the axillary artery was entered at the lower border of the axilla.

RESULTS

Probably the best way to show the results of these experiments is to tabulate the effects produced in each vessel by its distention. In each case the second blood pressure measured is at the point of greatest change during the period of stimulation.

It can be seen very easily from the following tables that distention of any of these vessels except the peripheral carotid artery even with extremely high pressures caused absolutely no uniform change in blood pressure. The largest average variation is only one millimeter of mercury.

The femoral artery or vein gave no indication of a reflex change of blood pressure or even of respiration at any time. These vessels were studied carefully from the bifurcation of the aorta to a point just below the knee. In other

TABLE II

PERIPHERAL FEMORAL ARTERY

Balloon Pressure mm. Hg.	Mean Blood Pressure before Stimulation mm. Hg.	Mean Blood Pressure after Stimulation mm. Hg.	Change mm. Hg.
546	134	135	1
630	137	133	—4
672	117	117	0
600	152	156	4
697	146	146	0
663	140	139	—1
680	134	133	—1
714	121	126	5
748	150	152	2
375	152	151	—1
390	153	155	2
435	157	157	0
590	166	164	—2
495	163	159	—4
450	167	161	—6
433	176	180	4
		Total	—1

Average —1/16 = —0.062 mm. Hg.

TABLE III

CENTRAL FEMORAL ARTERY

Balloon Pressure mm. Hg.	Mean Blood Pressure before Stimulation mm. Hg.	Mean Blood Pressure after Stimulation mm. Hg.	Change mm. Hg.
246	77	77	0
226	80	81	1
238	77	79	2
399	153	154	1
672	152	153	1
672	153	153	0
714	151	153	2
756	150	149	—1
		Total	6

Average 6/8 = 0.75 mm. Hg.

TABLE IV

PERIPHERAL FEMORAL VEIN

Balloon Pressure mm. Hg.	Mean Blood Pressure before Stimulation mm. Hg.	Mean Blood Pressure after Stimulation mm. Hg.	Change mm. Hg.
567	143	145	2
604	145	143	—2
525	141	144	3
504	131	133	2
525	135	135	0
		Total	5

Average 5/5 = 1 mm. Hg.

TABLE V

CENTRAL FEMORAL VEIN

Balloon Pressure mm. Hg.	Mean Blood Pressure before Stimulation mm. Hg.	Mean Blood Pressure after Stimulation mm. Hg.	Change mm. Hg.
158	87	86	—1
152	82	86	4
176	92	87	—5
166	87	83	—4
236	87	90	3
220	96	95	—1
222	96	98	2
236	94	93	—1
246	87	90	3
236	94	90	—4
220	77	74	—3
230	72	72	0
240	74	76	2
240	73	73	0
441	150	152	2
630	146	143	—3
600	143	145	2
630	143	143	0
		Total	—4

Average —4/18 = —0.22 mm. Hg.

TABLE VI

CENTRAL AXILLARY ARTERY

Balloon Pressure mm. Hg.	Mean Blood Pressure before Stimulation mm. Hg.	Mean Blood Pressure after Stimulation mm. Hg.	Change mm. Hg.
450	172	179	7
480	187	185	—2
570	196	195	—1
420	185	188	3
555	180	180	0
555	176	173	—3
480	177	176	—1
555	178	176	—2
525	179	181	2
495	176	174	—2
		Total	1

Average 1/10 = 0.1 mm. Hg.

TABLE VII

PERIPHERAL CAROTID ARTERY

Balloon Pressure mm. Hg.	Mean Blood Pressure before Stimulation mm. Hg.	Mean Blood Pressure after Stimulation mm. Hg.	Change mm. Hg.
663	113	94	—19
680	115	103	—12
595	112	99	—13
476	111	102	—9
680	109	88	—21
645	105	86	—19
615	105	86	—19
620	107	80	—27
645	113	96	—17
544	111	90	—21
525	125	116	—9
150	125	122	—3
300	127	116	—11
330	161	142	—19
150	152	147	—5
495	149	127	—22
450	147	131	—16
420	150	136	—14
330	157	145	—12
360	167	156	—11
420	160	152	—8
450	162	153	—9
495	173	158	—15
495	171	149	—22
465	172	138	—34
255	182	154	—28
450	180	151	—29
90	180	180	0
375	178	148	—30
180	178	168	—10
255	179	157	—22
675	177	142	—35
510	179	141	—38
495	129	113	—16
150	126	123	—3
270	132	123	—9
525	131	112	—19
		Total	—626

Average —626/37 = —16.92 mm. Hg.

TABLE VIII

SUMMARY

Vessel	Average Blood Pressure Change in mm. Mercury
Peripheral Femoral Artery	—0.062
Central Femoral Artery	0.750
Peripheral Femoral Vein	1.000
Central Femoral Vein	—0.220
Central Axillary Artery	0.100
Peripheral Carotid Artery	—16.920

words, the iliac, femoral, and popliteal vessels were investigated, and showed no signs of sensory pathways responding to changes in pressure inside the vessels.

The axillary artery and vein were usually rather small and only in one case was it possible to insert the balloon. This was done at the lower border of the axilla so that the balloon covered a stretch of about four inches from the axillary portion of the fore limb to the chest wall and slightly past that. In this portion of the artery four large branches were given off near the central end of the balloon. One branch was as large as the axillary artery itself. No change of blood pressure was noted during the period of distention, but as soon as the pressure was released a slight fall of blood pressure occurred in most cases (averaging two to three millimeters of mercury). This fall of blood pressure was probably due to the opening of these branches again, and was undoubtedly mechanical in nature.

In the carotid artery, however, the case is much different. Here even moderate degrees of distention cause a marked fall of blood pressure which begins five to six seconds after the beginning of stimulation. Furthermore the amount of blood pressure fall seems to be roughly proportional to the amount of pressure in the artery. A still more striking phenomenon is found in the fact that in most cases the blood pressure did not return to normal until the pressure had been released. Doubtless this is a reflex effect. It was found at post-mortem that the tip of the balloon must be almost at the base of the skull to produce any change. When the balloon was 4 centimeters lower down the artery, distention was without effect. Without a doubt this phenomenon is due therefore to the stimulation of the carotid sinus nerve of Hering, which is located at the junction of the external and internal carotid arteries. The balloon was found at post-mortem to lie in this region. The carotid sinus therefore responds to distention of the carotid artery at that point by lowering the blood pressure reflexly.

Since none of the vessels studied except the carotid artery gave any reflex change of blood pressure, and the carotid itself gave a response only when stimulated in a very circumscribed region, it seems probable from these experiments that the larger blood vessels as a whole do not have sensory nerves which respond to changes of pressure within their lumen by reflex changes of blood pressure. It might be that there are other responsive regions like the carotid sinus, but they have never been demonstrated. These experiments, however, have dealt only with increase of pressure within the vessels. The opposite process, decrease of pressure, or collapse of the vessel walls, has not been studied as yet.

It is evident that this mechanism has some function in the maintenance of normal blood pressure. It may also be of importance in abnormal conditions of the vascular system, either of hypertension or of hypotension. The sudden fall of arterial blood pressure due to stimulation of nerves in the region of the carotid artery suggests a possible relationship of this mechanism to the production of some type of reflex shock. Its specific relationship can be only a matter of conjecture at the present time, but further investigation of this subject is warranted along more definitely clinical lines.

CONCLUSIONS

1. Injection methods of studying the sensory nerve supply of blood vessels cannot be depended upon for good results.
2. The carotid sinus can be stimulated by pressure changes in the carotid artery.
3. Pressure changes in the other vessels studied give no reflex blood pressure changes.
4. Therefore it can be assumed that the blood vessels studied (except the carotid artery) have no afferent nerves capable of being stimulated by increased pressure from within, which carry impulses affecting blood pressure.

BIBLIOGRAPHY

1. Bernard, Claude: Compt. rend. Soc. de biol., 1852, 4:168.
2. Brown-Sequard, C. E.: Philadelphia Med. Exam., 1852, 8:481.
3. Heger, P.: Beitr. sur Physiol., Carl Ludwig gewidmet, Leipzig, 1887, p. 193.
4. Spallitta and Consiglio: "I nervi vaso-sensitivi," Palmero, 1896.

5. Delezenne, C.: Compt. Rend. Acad. d. sc., 1897, 184:700.
6. Pagano, G.: Arch. ital. de biol., 1900, 33:1.
7. Lennander, K. G.: (1901) Quoted from Odermatt.
8. Odermatt, W.: Beitr. z. klin. Chir., 1922, 127:1.
9. Ranson, Windle and Faubion: Am. Jour. Physiol., 64:320, (April) 1923.
10. Freidrich, H.: Klin. Wchnschr., 1924, 3:2035.
11. Dennig, H.: Klin. Wchnschr., (April 22) 1924, 3:727.
12. Dennig, H.: Klin. Wchnschr., (January 8) 1925, 4:66.
13. Bier: (1907) Quoted from Odermatt.
14. Hotz: Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1909, 20:2.
15. Hess and Konigstein: Wien. Klin. Wchnschr, 1911, p. 1460.
16. Cain and Hamburger: Bull. et mem. Soc. med. d. hop. de Par., (April 23) 1926, 50:629.
17. Leriche: Presse med., 1917, p. 513.
18. Brown, G. E.: Ann. Clin. Med., (August) 1926, 5:168.
19. Bayliss, W. M.: The vasomotor system, London, 1923.
20. Bradford, J. R., and Dean, H. P.: Proc. Roy. Soc. Med., 1894, 45:369.
21. Brodie, T. G., and Dixon, W. E.: Jour. Physiol., 1904, 30:476.
22. Fuhner, H., and Starling, E. H.: Jour. Physiol., 1913, 47:286.
23. Bayliss, W. M., and Hill, L.: Jour. Physiol., 1895, 17:120.
24. Obersteiner: Arbeiten a. d. Institut f. Anatomie u. Physiologie d. Central nervensystems, 1897, p. 5.
25. Morison: Edinburgh Med. Jour., 1898, p. 413.
26. Huber: Jour. Comp. Neurol., 1899, 9, No. 1.
27. Rohnstein: Arch. f. mikr. Anat. u. Entwicklngsmechn., 1900, 55:4.
28. Hunter, W. A.: Jour. Physiol., 1900-1901, 26:465.
29. Markwalder, J. and Starling, E. H.: Jour. Physiol., 1913, 47:275.
30. Gaskell, W. H.: London: Longmans, 1916.
31. Hartman, F. A., Blatz, W. E., and Kilborn, L. G.: Jour. Physiol., 1919, 55:92.
32. Berglas: Ztschr. f. d. ges. Anat., 1925, 77:481.
33. Langley: Jour. Physiol., 1923, 58:70.
34. Wiedhoff: Beitr. z. klin. Chir., 1924, 130:399.
35. Schlif: Klin. Wchnschr., 1924, 3:346.
36. Woollard, H. H.: Heart (December), 1926, 13:319.
37. Dogiel, A. S.: Arch. mikr. Anat., 1898, 52:44.
38. Schafer, Sir E. S.: Textbook of microscopic anatomy, London: Longmans, 1912.
39. Bayliss, W. M.: Jour. Physiol., 1901, 26:173.
40. Bruce, A. N.: Arch. exper. Pathol., 1910, 63:424; Quart. Jour. Exper. Physiol., 1913, 6:339.
41. Spiess, G.: Munchen Med. Wchnschr., 1906, 58:345.
42. Cyon, E. and Ludwig, C.: Ber. Sachs. Ges., 1886, 18:307.
43. Tschermak, A., and Koster, G.: Pfluger's Arch., 1893, 93:24.
44. Bayliss, W. M.: Jour. Physiol., 1893, 14:303.
45. Sollmann, T., and Brown, E. D.: Am. Jour. Physiol., 1912, 30:88.
46. Hering, H. E.: Munchen Med. Wchnschr., (September 12) 1924, 17:1265.

BLOOD TRANSFUSION WITH A REPORT OF ONE HUNDRED AND FIFTY CASES*

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IN 1667 Jean Baptiste Denys, physician to Louis XIV, performed a blood transfusion on a youth, introducing sheep's blood into the veins of his patient. Since this courageous piece of work, probably the first successful blood transfusion, much water has flowed under the bridge, or, I suppose one might say, much blood has flowed through the veins. Enjoying at various times, and sometimes at the same time, the enthusiastic reception in certain quarters and bitter opposition in others common to all new ideas, at times heralded as the ultimate panacea for all ills and at others forbidden by royal edict, this procedure has survived the vicissitudes of changing medical thought for two hundred and fifty years. It is only now coming to be regarded as almost entirely devoid of evil consequences and its wide application fairly well understood.

The earliest workers in this branch of surgery were confronted by a host of problems, both biological and technical. Utterly ignorant of blood incompatibility and unable for the most part to overcome the difficulties subsequent to rapid coagulation of their medium, their results were often negative, and almost as often disastrous. The modern use of sodium citrate as an anti-coagulant, and the investigations of Landsteiner, Moss, and Jannsky resulting in the establishment of the four blood groups, followed by the perfection of apparatus for the direct transfusion of blood, have raised this operation to the level where it is no longer viewed as a last desperate resort, but as a therapeutic procedure of almost universal safety and immense benefit in a constantly growing list of ailments.

Of the many conditions benefited by the introduction of fresh blood which are given in the following list, some are obvious and are universally accepted. Several are still open to question and undoubtedly will often fail to give the desired results. There are two or three conditions in which transfusion is still considered dangerous by some workers; however, there is no condition given for which some author has not reported favorable results of transfusions in series of cases. Thus one is led to believe that in even the most doubtful a transfusion is at least worth a trial.

Indications:

1. Acute hemorrhage
2. Chronic hemorrhage
3. Pernicious anemia
4. Severe secondary anemia
5. Hemorrhagic diathesis
   a. Hemophilia
   b. Purpura
   c. Hemorrhagic disease of the newborn
   d. Thrombocytopenia
   e. Melena neonatorum
6. Severe toxemias of
   a. Burns
   b. Erysipelas
   c. Acute intestinal intoxication
   d. Septicemia.
   e. Septic pneumonia
   f. Infectious diarrhea
7. Shock
8. Preoperative, for poor surgical risks
9. Postoperative
10. Carbon monoxide poisoning
11. Premature and debilitated infants
12. Starvation in newborn, with dehydration and acidosis
13. Immuno-transfusion in septicemia and bacteriemia

In acute hemorrhage with the loss of a large amount of blood the treatment by means of transfusion is so well established that it hardly merits discussion. That the replacement of the loss in blood volume by a fluid identical with that lost is ideal, is axiomatic, and it is therefore in this type of case that the results are most dramatic. Severe secondary anemias which often require several months treatment to raise the hemoglobin to the desired level and in which the patient is under par during the time the attempt is being made, respond very promptly to the introduction of fresh blood, and moreover in instances of individuals who are apparently unable

*From the Miller Clinic.

to raise their own hemoglobin, the new level left by the transfusion is usually held very well. In pernicious anemia, while blood transfusion is not considered in any sense of the word curative, the injection of whole blood furnishes the best and quickest method of rescuing the patient from immediate danger, and often apparently serves to tide him over into a remission. Morowitz, describing 200 transfusions done for pernicious anemia, goes so far as to state that a large transfusion will always result in a remission, a belief not generally held. He feels that remissions are not caused by a replacement of the blood alone, but by the inhibited destruction of the red cells. Studies in nitrogen metabolism showed a quantity of urobilin excreted in a period of two days following a transfusion for pernicious anemia corresponding to the amount of hemoglobin transfused. None the less, states Morowitz, this same patient shortly had a remission lasting nine months.

In the hemorrhagic diatheses blood transfusion can ordinarily be expected to give relief, although, in view of the work of Lewisohn, Renaud, and others, it becomes a question in certain of these conditions whether to employ unchanged blood or to use a method entailing the use of sodium citrate. In thrombocytopenia with a platelet deficiency and a patient depleted to the point where even a splenectomy constitutes a grave surgical risk, whole blood intravenously is the remedy par excellence.

Cross reports 519 transfusions in children, 122 of which were exsanguination transfusions for the relief of severe toxemias resulting from burns, acute intestinal intoxication, septicemia, toxic pneumonia, infectious diarrhea, etc. Jones feels that no patient whose response to infection is below normal should be allowed to struggle against the infection without the aid of a transfusion. Another author makes a routine practice of performing a preoperative transfusion on all surgical patients whose hemoglobin is below 60 per cent. Moore and Dennis state that in premature infants too weak to assimilate food the increasing of the blood content 50 per cent is a life-saving procedure, and that in starvation of the newborn, with dehydration and acidosis, nothing supersedes blood transfusion.

As to the use of blood transfusion in acute septic states, one is forced to admit that it is in this type of case that the least may be expected, although now and then a result stands out as being little short of a miracle. Immuno-transfusion, using the blood from immunized donors, may prove to be of value in certain cases where there is lacking the normal response of the patient's blood to the infection. Wright demonstrated that in severe septicemia an ordinary transfusion is of little value since as a rule normal blood contains fewer protective substances than the blood of the infected patient. He suggested transfusing with the blood of a donor who had been vaccinated with the patient's infecting organism. Colebrook and Storer describe tests to determine whether a patient should be treated with vaccines or by immuno-transfusion. If it is decided that vaccines would be of no avail, the donor is given a subcutaneous injection of vaccine and when sufficiently immunized his blood is taken and given directly, without the admixture of citrate, to the patient. They report nine cases of immuno-transfusion in which the procedure was of value, and seven in which no benefit was derived. Unger starts the immunization with an initial dose of one billion and gives as much as 100 to 150 billion in a week, the doses being given daily. He states that it requires nine to ten days to develop immune bodies in a donor. He reports forty-two cases of septicemia in which ordinary transfusion was used, of which number nine recovered. In the second group of cases, the donors were vaccinated with organisms from the patients' blood; none recovered. In the third group of fifteen cases, eight received blood from a donor who had been immunized with the organism taken from some other patient; three recovered. Seven were transfused with the blood of a donor who had been immunized with the organism obtained from the patients' blood; five recovered. Our only case of immuno-transfusion was that of a case of subacute bacterial endocarditis, in which there was no apparent benefit.

On the subject of the method to be used in introducing the blood there is much to be said—and probably much that will be ignored concerning each method by the exponents of other methods. The issue at present seems to be the choice of one of two methods, the one employing sodium citrate as an anti-coagulant, and the other utilizing whole, unchanged blood. The citrate method is perhaps simpler and more quickly available for many physicians, the citrate elim-

inating the necessity for hurry, and permitting an operation which hardy admits of total failure. It is, no doubt, quibbling over a trifle to say so, but I feel that whole blood is the ideal substance to be used. In most cases it actually makes very little difference which technic one uses, and with certain exceptions such as, for example, thrombocytopenia with a platelet deficiency, and septicemia where it has been shown that citrate impairs the function of the leukocytes, certainly the technic with which the surgeon is most familiar and does most expertly is the one to use. Lewisohn, in a study of citrate transfusions after ten years, believes this method to be the simplest and says that reactions are not due to citrate, also that direct methods prevent the use of a cannula in the median cephalic vein in infants. I can only say from personal experience that our reactions were materially reduced when the change was made from the citrate to the direct method, and also that I have never failed in an attempt to get a cannula into the veins of an infant.

Rosenthal and Baehr have shown that there is a marked shortening in the coagulation time following the intravenous injection of sodium citrate. This becomes maximum in one hour and persists for many hours. The action of sodium citrate in vivo is directly opposite to that in vitro, the platelets in the circulating blood being destroyed with the gradual liberation of thromboplastic substances. The number of platelets begins to decrease immediately and the maximum reaction is obtained in fifteen minutes with a return to normal in one hour. No change is noted in other factors such as calcium, fibrinogen, and anti-thrombin. The shortening in the clotting time fails to occur in individuals with a diminished number of platelets. Thus there is every reason to believe that there is a definite contra-indication to the use of citrated blood in purpura hemorrhagica or thrombocytopenia where there is a dangerous decrease in the number of platelets.

On the other hand Tzavaru, Mavrodin, Renaud, and others report series of cases of hemorrhage of various origins in which a prompt cessation of the bleeding occurs on the intravenous use of 15 to 20 cubic centimeters of 30 per cent sodium citrate. In line with this idea one would feel that citrated blood might act more efficiently than whole blood in the treatment of a persistent and concealed hemorrhage that could not be controlled by other means, although in such a case I would prefer to give unchanged blood, and then administer sodium citrate intravenously in more nearly therapeutic amounts than that used as an anti-coagulant. I merely mention the above because there is undoubtedly a justification for some difference of opinion as to the choice of methods.

No description of the citrate or indirect method is necessary, as it merely consists in allowing the desired amount of blood to flow from the donor's veins into the citrate solution, after which it is introduced into the vein of the recipient either by means of a series of syringes, or through a needle which is connected to a receptacle by a rubber tubing. Of the direct methods it may be said that there are several very satisfactory outfits on the market, or, in the absence of any of those, a series of syringes may be used. The transfusions reported in this series were done with the Scannell direct transfusion apparatus.

Before the study and establishment of the four blood groups, severe reactions, usually the result of agglutination or hemolysis, were all too common, so that the operation of blood transfusion had difficulty passing the stage where it was considered anything more than a last-resort procedure. While it is known that the four groups are not all-conclusive and it is a recognized fact that there are sub-groups, the fact remains that with careful grouping and insistence on cross-matching of the donor's and the recipient's blood, there is extremely little likelihood of serious consequences arising as a result of hemolysis or agglutination. Occasionally, in spite of grouping, fatalities have occurred. When in the case of such an accident all other possibilities have been excluded and the death has been accompanied by shock, hemolysis, and hemoglobinuria, the source of error may be any of the following:

1. Lack of skill in grouper
2. Deterioration of test sera
3. Deceptive reactions
4. Pseudo-agglutination (rouleaux-formation)
5. Deviation of group from the four classical types, with formation of new agglutinins
6. Temporary bacteriemia causing no disturbance in donor.

The American Society of Immunologists considers thirty minutes at room temperature suf-

ficient to show agglutination in a test of blood for grouping or matching. Shera, in a study of a fatal case of suppression of urine following a blood transfusion, found no agglutination at room temperature at the end of thirty minutes, but found on repetition that it occurred at the end of sixty-five minutes. He now incubates the slides at 37 degrees centigrade from 60 to 75 minutes, placing them in Petri dishes lined with moist filter paper. Opitz, in transfusions in children, makes a preliminary injection of from 20 to 30 cubic centimeters of blood and then pauses to note any evidence of reaction due to incompatibility. In spite of this precaution there was, in his series of 200 transfusions, one death from hemolysis. Two much stress cannot be put on the paramount importance of careful grouping and matching.

When one considers the causes of the reactions which more or less do follow in the wake of this procedure, one feels that in general the more skilled the operator the fewer in number the reactions will be. Lewisohn in an article on citrate transfusions states that when blood transfusion was taken out of the hands of inexperienced operators at Mount Sinai hospital the incidence of reactions was reduced from 34 to 8 per cent in the citrate, and from 23 to 13 per cent in the Unger method. He feels that many of the reactions seen in the citrate method are due to a chilling of the blood which takes place while it is being collected. Mueller tabulates the causes as follows:

I. Technical
   1. Too rapid transfusion
   2. Partial destruction of red cells in passage through needle
   3. Formation of small clots
   4. Toxic action of citrate

II. Biological (Important)
   1. Improper grouping and matching.

Lewisohn contends that reactions are never due to citrate and submits in defense the work of Newhof and Hirschfield, who injected 6 to 8 grams of sodium citrate intravenously without causing a reaction. However, as was stated above, citrate has a directly opposite action on blood in a test tube to that in the body, so this does not appear to be a valid argument. In my own series the reactions in the direct transfusions were markedly less than those occurring in the citrate method, but whether this was a result of this single factor or not is impossible to say. I believe that when all other factors are eliminated as possible causes there are still a small number of reactions left due to citrate alone, although I believe it is true that reactions from this source will never prove serious. Rolleston gives three types of reactions, as follows:

1. Agglutination and hemolysis — occurring immediately
2. Proteolytic—delayed 1 to 2 hours
3. Systemic or constitutional reactions.

Shera reports one, and Blaker and Dodds two cases of uremia due to mechanical blocking of the kidneys and liver with blood cell agglutinations. Bancroft reported a case of anuria following a transfusion for the relief of uterine bleeding in which 400 cubic centimeters of blood were given. Anuria followed the first day following the transfusion, with one ounce of urine being passed in twenty-four hours and an increase in the creatinin and blood urea. Complete decapsulation of both kidneys resulted in the recovery of the patient.

Oehlicker divides the reactions into two groups, the immediate ones occurring in the first three minutes and accompanied by shock phenomena and later by hemolysis and hemoglobinuria, and those occurring later which he says are due to an idiosyncrasy of the patient to the newly introduced serum. It is quite possible to have a reaction in a patient receiving blood from a donor who has safely given blood to the patient before. One explanation of this phenomenon can be found in the fact that sometimes the blood of a patient is so depleted that the agglutinins are not present in sufficient amounts to cause agglutination, but after the first or second transfusion these substances may have increased to the point where they give a reaction with the blood of a donor whose blood had previously been used with safety. This is merely another argument for cross-matching every time a transfusion is done, regardless of the donor. It is also a well-known fact that an individual's group may be altered by having had his blood mixed with that of one or more donors, particularly when the blood used has been of another group.

The amount of blood given depends of course upon the condition for which it is being given, and the size and weight of the patient. With the exception of those cases of acute hemorrhage with massive loss of blood, and exsanguination-

transfusion, the tendency is towards smaller amounts given oftener. It is our practice to give, unless there are indications to the contrary, in the neighborhood of 500 cubic centimeters to the average adult. Copher in a study of 245 cases reports as much as 2,000 cubic centimeters given at one time. In hemorrhage of the newborn Le R. Brooks advises amounts of from 100 to 200 cubic centimeters. Opitz gives infants from one-fifth to one-third the total blood volume. It has been our practice to give infants and small children approximately 15 cubic centimeters per kilo weight. Holbertisma states that the change in the number of corpuscles depends in the main on body weight and the quantity of blood given, and that in general an increase of 1 million red cells depends on the use of 15 cubic centimeters per kilo of body weight. Moore and Dennis, in the use of citrated blood subcutaneously, give 50 cubic centimeters per kilo in newborn infants and up to one year of age. At two years of age 25 cubic centimeters is the optimum. They use 90 cubic centimeters of blood and 10 cubic centimeters of a 2 per cent citrate solution, and make a point of introducing it subcutaneously, and not intramuscularly.

Our own series of 150 transfusions comprise both citrate and direct methods, the latter in preponderance, since once having taken up the direct method one is loath to return to the citrate. The entire series was done on eighty-three patients, fifty being females, and thirty-three males, with a number of infants in each group. The largest number of transfusions done on any one patient was five. A list of the conditions for which the transfusions were given, together with the result when the hospital stay was terminated, is given below:

	Well	Improved	Died	Total
Pernicious anemia	0	11	3	14
Secondary anemia	1	10	0	11
Duodenal or gastric ulcer	1	4	2	7
Carcinoma of intestinal tract	0	2	4	6
Menorrhagia	4	2	0	6
Septicemia	2	0	3	5
Postpartum hemorrhage or shock	3	1	0	4
Postoperative hemorrhage or shock	3	0	1	4
Acute mastoiditis	2	1	1	4
Thrombocytopenia	1	1	2	4
Pelvic inflammatory conditions	2	1	0	3
Myelogenous leukemia	0	1	1	2
Lymphatic leukemia	0	0	2	2
Uterine fibroids	1	1	0	2
Puerperal anemia	1	0	0	1
Carcinoma of bladder	0	1	0	1
Carcinoma of prostate	0	0	1	1
Subacute bacterial endocarditis	0	0	1	1
Hemophilia	0	1	0	1
Rupture of liver	0	0	1	1
Ulcerative colitis	0	1	0	1
Pyemia	0	1	0	1
Carbuncle of upper lip	0	0	1	1
	21	39	23	83

There were in the series twenty-eight transfusions using sodium citrate as an anticoagulant. Among these there were fourteen reactions, or 50 per cent. In the remaining 122 transfusions in which unchanged blood was used there were twenty reactions, or 19.7 per cent. In the series in which cross-matching was used in addition to the grouping, the reactions occurred in 11.1 per cent of cases. All rises in temperature or chills following transfusions, unless such phenomena were more or less regular occurrences, were interpreted as reactions from the transfusion. From these figures it appears that the incidence of reactions has been reduced by using fresh, unchanged blood, and still further reduced by careful cross-matching in addition to typing.

The various groups were encountered as is shown in the following table:

Group I	3 cases
Group II	35 cases
Group III	12 cases
Group IV	33 cases

REFERENCES

1. Bancroft, F. W.: Anuria following transfusion. Ann. Surg., 1925, lxxxi, 733.
2. Brooks, Le R.: Indications for blood transfusion. Cal. and West. Med., 1928, xxviii, 331.
3. Copher, G. H.: Blood transfusion. A study of 245 cases. Arch. Surg., 1923, vii, 125.
4. Colebrook, L., and Storer, E. J.: On immuno-transfusion. Lancet, 1923, ccv, 1341.
5. Cruchet, M.: Transfusion of blood from animal to man. Brit. Med. Jour., 1926, ii, 975.
6. Cross, G. K.: Report on blood transfusion work seen in the hospital for sick children in Toronto. Brit. Jour. Child. Dis., 1924, xxi, 173.
7. Dyke, S. C.: The determination of compatibility in bloods. Lancet, 1927, ccxiii, 910.
8. Filatov, A.: Clinical and experimental contribution on the effect of blood extravasated into the body cavities. Arch. f. klin. Chir., 1928, cli, 184.
9. Goebel, F.: Blood transfusion in infancy and early childhood and the nature of its action. Zeitsch. f. Kinderheilk., 1925, xxxix, 258.
10. Grossman, H.: Transfusion of autogenous blood with a fatal result. Zentralb. f. Gynaek., 1924, xlviii, 2065.

11. Gordon, W.: Venesection and blood transfusion in carbon monoxide poisoning. Brit. Med. Jour., 1925, ii, 1049.
12. Halbertsma, T.: Concerning the quantity of blood administered in blood transfusion. Nederl. Tijdsch. v. Geneek., 1922, lxvi, 1272.
13. Higgin, C. C.: The influence of the various factors on the hemagglutination of the red blood corpuscles. Am. Jour. Med. Sc., 1926, clxxii, 510.
14. James, M. L.: The value of blood transfusion in acute and chronic infections. Med. Jour. and Rec., 1925, cxxi, 16.
15. Keynes, G.: Blood transfusion in surgery. Brit. Med. Jour., 1926, ii, 880.
16. Korganowa-Mueller, F. S.: The causes of reactions following blood transfusions. Russkaja Klin., 1925, iv, 46.
17. Khoor, O.: The value of blood transfusion in acute and chronic anemia. Zentralbl. f. Gynaek., 1924, xlviii, 1714.
18. Lewisohn, R.: The citrate method of blood transfusion after ten years. Bost. Med. and Surg. Jour., 1924, cxc, 733.
19. Morawitz, P.: Blood transfusion. Monatschr. f. Kinderheilk., 1926, xxxi, 320.
20. Moons, E.: Observations in a case of auto-transfusion. Ulaamsche geneesk, tijdsch., 1923, iv, 189.
21. Moore, C. V., and Dennis, G.: Subcutaneous blood transfusion in children. Northwest Med., 1928, xxvi, 140.
22. Oehlecker: Hemolysis in spite of blood grouping. 52 Tag. d. deutsch. Ges. f. Chir., Berlin, 1928.
23. Opitz: Blood transfusions in pediatrics. Monatschr. f. Kinderheilk., 1926, xxxi, 306.
24. Renaud, M.: The arrest of hemorrhage by intravenous injection of sodium citrate. Bull. et mem. Soc. med. d. hop. de Paris, 1924, 3s, xlviii, 687.
25. Rolleston, Sir H.: Indications for blood transfusion. Brit. Med. Jour., 1926, ii, 969.
26. Strauss, A. A.: Blood transfusion by the direct syringe cannula needle method. Surg., Gyn. and Obs., 1925, xli, 678.
27. Shera, G.: Fatal suppression of urine caused by latent hemagglutinins. Brit. Med. Jour., 1928, i, 754.
28. Sidbury, J. B.: Transfusion in childhood, Jour. Am. Med. Assn., 1927, lxxxix, 855.
29. Stegemann, H.: Hemostasis induced by blood transfusion. Arch. f. klin. Chir., 1923, cxxi, 759.
30. Sidbury, J. B.: Transfusion through the umbilical vein of the newborn. Am. Jour. Dis. of Child., 1923, xxv, 290.
31. Tzavaru, and Mavrodin, D.: The quick arrest of genital hemorrhage in the female by the injection of a concentrated solution of sodium citrate. Presse Med., Paris, 1927, xxxv, 986.
32. Unger, K. J.: The transfusion of blood from immunized donors. Laryngoscope, 1923, xxxiii, 145.
33. Rosenthal, N., and Baehr, G.: Paradoxical shortening of the coagulation time of the blood after the intravenous administration of sodium citrate. Arch. Int. Med., 1924, xxxiii, 535.

THE MEDICAL RESERVE

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IN the brief time at my disposal it will be necessary to consider only the problems of the Medical Reserve Corps without considering their relation to pacifism, etc. The problem of National Defense is your responsibility, just the same as it is that of every other citizen. Preparation for national defense holds the same relation to national security that life and fire insurance do to the family, police and fire department to the city, and state police to the state. Our present state of development does not yet uphold the Utopian ideal that life and wealth are perfectly safe anywhere.

Following the close of the World War, Congress saw fit to adopt the present policy of National Defense in the year of 1920. The need of such preparation was amply demonstrated after the mobilization of 1917.

The land defense force now consists of the Army of the United States, often called the three in one Army. It is composed of one part Regular Army, two parts Militia, and three parts Reserves. It is not the wish of the American people to have a large standing army, but rather to depend upon its trained citizens. The Regular Army is now acting almost entirely as instructor for the other components.

Three sources of candidates for the Reserve are available:

1. High school boys and others of 17 to 24 years of age, who are trained for one month at the summer Citizens' Military Training Camps. The boys are not paid, but all expenses are taken care of by the Government. Every safeguard to moral and physical health surrounds these boys. These camps also help to solve one of the modern problems of occupation for boys during vacation time.

2. The Reserve Officers Training Corps, consisting of university and college men. In some schools the course is compulsory, in other voluntary. During the college course one period of six weeks is spent in training camps. These young men receive some compensation during the college year and are paid while in camp. It is from this group that most of the officers for the Reserve will be drawn in the future.

3. The Officers Reserve Corps, consisting of officers who have had service during the World War or who have been since appointed in the various grades; either from the Reserve Officers Training Corps, or directly from civilian life. National Defense requires a certain amount of service from all able-bodied male citizens, and it is probable that in case of another national emergency not only all the men, but all the women and older children would also be required to serve in some capacity. This is an obligation imposed upon every citizen to compensate to some extent for the many privileges we enjoy as citizens of this great country.

Naturally, in such a plan the medical profession plays a large and important part. The doctor is one of the first men to go into action and about the last out. You recall the mobilization of 1917, and how the doctors were called upon first, in order to select the physically fit and eliminate the unfit. You may also recall that during this mobilization it was necessary to assemble a large number of officers for training before the drafted men could be called into camp, as we were so totally unprepared to handle an army. This training program which we are now carrying on is designed to obviate such a recurrence in case of another mobilization.

Right here I wish to call attention to one thing on which the Medical Department hopes to improve its record in the future. We failed to eliminate all the mentally unstable, and as a consequence we now have a tremendous problem that the Veterans Bureau is handling and will continue to handle for many years. It is a distinct challenge to the Medical Profession to develop a method that will prevent the recurrence of such a disaster in case we should ever be called upon to meet another national emergency. We must find some way of eliminating the mentally unfit. A person may be handicapped physically in many ways and still be useful, but if he is mentally unstable he has no place in the

National Defense, and not only no place, but is a burden to all concerned. I therefore invite your serious consideration to this problem of proper classification of the mentally incompetent. It must be properly solved, not only in case of war mobilization, but for the peace time industrial mobilization that is constantly in progress, where large numbers of competent men must be gathered together. It is now especially necessary, as the urge of still greater speed appears to be at hand, and if any man should be nervously stable, it is the man who is controlling an airplane. So, the problem is not one entirely for the military, but has a very strong bearing on civil life.

Many of our doctors object to the training offered by the Reserve Corps on the grounds that a medical man does not need it. While it is true that a certain amount of the medical military work can be done without special training, there still is a greater amount of it which requires much special work in order to be fitted to handle the medical department problems efficiently. Of course, a well trained surgeon can step into the operating room of a military hospital and carry on. The same is true as far as the medical wards are concerned, but this is about as far as the routine training of civil life will successfully operate. We have the same problem in the medical department on a somewhat smaller scale that the line troops have, *i.e.,* we must select our men, train, feed, clothe and shelter them. We must be able to transport them, guided only by a map oftentimes; and know how and where to get supplies for our work; so it is necessary that every man that serves with the army should have certain basic training. It is essential that he know something of the organization of the Army, that he may play his part. If he knows nothing of the other departments of the Army he can not properly function as part of the team.

What methods are available for acquiring this necessary basic knowledge? There are now well established correspondence courses, starting from the beginning and carrying through to the advanced medical military work. There are the summer training camps, of two weeks each summer, in which a large number of officers are assembled and who are trained in the special problems of their particular units. Regular courses of two to six weeks are given at Carlisle Barracks, especially for commanding and administrative officers.

Conference courses are also established at various places where a group of Reserve Officers can be assembled, especially where a fair number belong to the same organization, such as a General or Evacuation Hospital, or a Medical Regiment, and these groups take up the study of their special problems. And for the younger men a special Flight Surgeon's course of three months is given at San Antonio, Texas. This is a very excellent post-graduate course and fits the students for the rapidly advancing demand for civilian flight surgeons.

The Medical Department is a large organization and is comprised of the Medical Corps, the Dental Corps, the Veterinary Corps, the Medical Administrative Corps, the Sanitary Corps, the Nurse Corps and the enlisted personnel. Our active organizations are General Hospitals, Surgical Hospitals, Evacuation Hospitals, Station Hospitals, Convalescent Hospitals, Regimental Medical Detachments, and, the latest organization, the Medical Regiment. It is therefore essential that a doctor who is to take up the work in the Army should know something of his own department at least and its relation to the rest of the Army.

In order to convey to you as vividly as possible what certainly would be the problems of some of you in case of mobilization, let us assume that a great national crisis exists and that mobilization is ordered. How big is the job ahead of us?

I stated that the Army is now on a one-two-three basis: one part Regular, two parts National Guard, and three parts Reserve. Our present mobilization plans provide for six field armies, and this means nine Regular Army Divisions, eighteen National Guard Divisions, and twenty-seven Reserve Divisions. Roughly, a Division is 20,000. A simple problem in arithmetic shows:

9 Divisions Regulars	180,000
18 Divisions National Guards	320,000
27 Divisions Reserves	540,000
	1,040,000

These are the active fighting forces and do not include the vast numbers necessary in the supply, transportation, record and other auxiliary

departments, nor the corps and army auxiliary combat troops.

This would require approximately 200,000 officers, and of these some 20,000 would belong to the Medical Department and 16,000 would be Medical Corps. Recall further that this is not the end, but only the beginning, as in the last war we had about four times that number engaged at the time of the Armistice. Is it probable that a problem of this magnitude can be attempted with any chance of success without extensive preparation over a long period?

But, you may object, the doctor's business is to get people well, and will he have more to do with all this mobilization than to care for the sick and injured? Yes, vastly more. During peace times in well organized hospitals, we merely notify the proper authority that we will operate and when, and everything is ready for us. Did you ever work out all the details of just how this very technical preparation comes about? As your work is in the professional domain and not in the executive, it would not be suprising if you had not. But such perfection of administration does not just happen. Someone is on the job long before you step into the operating room.

In war time the Medical Department will have to organize and handle its own department and woe be to our country if we fail on the job. Nothing does more to maintain the morale of a command than the knowledge that if injuries do come an efficient medical service is at hand to give prompt and skilled relief. But how are we to do this if someone can not organize, equip and manage the relief agencies such as the Evacuation and Surgical Hospitals far up at the front, cannot provide and maintain an efficient and rapid evacuation such as our Medical Regiments are designed for, provide definite hospital treatment at the general hospitals, administer Convalescent Camps and finally see that the injured and broken down reach home safely? All of these are Medical Department functions. You will not find these units organized, equipped and ready to serve unless you do the work.

Suppose for example, you are the Commanding Officer of General Hospital. This organization has 42 Medical Department Officers, 120 Nurses, 400 Enlisted Men. With this force you are expected to handle a 1,000 bed hospital in all of its departments and in a crisis be able to nearly double that capacity for a time. You are in a foreign country. Buildings of the shack type are available. Supplies for the unit are in box cars on a side track four miles away. Motor trucks are turned over to you. You are directed to prepare a place for your nurses, who will arrive in two days; to be ready to receive patients from the front in four days. What would you do? If your organization is trained and each man knows his job, the task is not at all impossible; but with an untrained and undisciplined group nothing but chaos could result. It is the answer to such problems as this that we work out in camp.

To make the problem still more vivid, consider for a moment what might happen right here in St. Paul, if a national crisis similar to that of 1917 should recur. As Corps Area Surgeon of the Seventh Corps, *i.e.*, Minnesota, Iowa, Missouri, Arkansas, North and South Dakota, Nebraska, and Kansas, it is my job to know something of the medical resources of these particular states, but this discussion will apply only to Minnesota.

The last American Medical Association directory shows the population of Minnesota as 2,387,125; of this number there were 5,806 doctors of medicine, 3,328 of this number were members of the American Medical Association. In the state there are 233 hospitals with a bed capacity of 24,551, with an average patients hospitalized, 19,778. The hospitals in your state may be classified as follows: Individual, 62; independent, 44; church, 47; state, 19; county, 15; city and county, 4; city, 13; partnership, 17; fraternal, 5; Indian, 4; Veterans Bureau, 1; industrial 1; and Army, 1. At the time of this survey there were approximately 267 medical reserve officers in the state of Minnesota. Briefly, the above figures will show that the ratio of doctors to your population of the state is 1 to 411. The ratio of doctors, members of the American Medical Association, to the population is 1 to 719. And the ratio of doctors in the Medical Reserve to Doctors that are members of the American Medical Association is 1 to 12.5.

If this country is called upon to mobilize its man power for major effort in the event of war, your state would probably be called upon to furnish upon M day (which means day war is declared), until a period of probably 120 days thereafter, approximately 60,000 men. Many of you know, as a result of our last war, what a task

this would mean for the Medical Department. Our duties and responsibilities in the Medical Department are specifically laid down in Army Regulations. It may be tersely said that it "consists of conservation of the man power of this country." In my opinion, our task is greater on M day than any other branch of the service. Immediately we must perform physical examinations in the case of all voluntary enlistments and later of the draftees at the reception centers established throughout the country. In your state, such a reception center would probably be placed at Fort Snelling.

Medical personnel would be also required for special training battalions to care for those found suitable for "limited service only," when their defects are considered curable. Probably the present station hospital of Fort Snelling would become the reception center hospital which would naturally have to be expanded to meet the situation. The Crane General Hospital at St. Paul, an inactive Regular Army Unit, with a capacity of 1,000 beds, would immediately be placed in operation.

Station Hospitals would also be stationed elsewhere through the state provided the number of troops mobilized and distances from St. Paul and Minneapolis indicated such a procedure desirable. Our plans as a whole, roughly, means that our requirements would be 92 medical officers in St. Paul, and 2,100 beds for Corps Area overhead troops. Medical Officers for the Corps Area service overhead, in addition to the Medical Department personnel required for the units mobilized in the state of Minnesota, approximately 684; making a total of 776. We said previously, that at the present time there were 267 Medical Reserve Officers in the state of Minnesota, and now I have shown you the probable needs in the way of Medical Reserve Officers on M day, or shortly thereafter, in order to conserve the man power of our army in time of war.

While there are many active and interested Medical Reserve Officers in your state, these figures readily illustrate just how far the medical profession lacks in its part in the preparation for National Defense. These figures that I have given you are very conservative and have not included those officers sent to training schools or required as an overhead service command by the War Department. It is believed that all able-bodied doctors not in the Reserve Corps on M day would be classified as student candidates and would probably not be commissioned until graduated from training schools. This naturally means that the doctor of medicine not a Reserve Officer can not participate in our big problem at a time when he is vitally needed.

In addition to the hospital units required by Corps Area service overhead in case of national emergency, the following hospitals would probably be mobilized in the state of Minnesota: Ten General Hosptals, 1 Evacuation Hospital, 1 Surgical Hospital, 1 Convalescent Hospital, 1 Hospital Center and 1 Medical Laboratory. This does not include the medical personnel attached to line organizations.

The discipline, training, feeding, housing and morale of a command demand thought and study. These problems are likely to be forced upon any one of us in time of serious stress, and it is to handle such emergencies that the special training for Medical Department personnel has been instituted. We do not expect that you will become past masters of all the arts of command, but we do know that the fact that you have thought on the subjects, have been in camp, seen some of these problems worked out, and have a mental picture of the tasks involved, will make for much greater chance for success than could possibly be the case where no thought has been given to such problems.

I am particularly anxious to have the medical profession consider this as its own problem. Practically every doctor will be required to serve in some capacity in case we are ever unfortunate enough to be drawn into war again, and he will naturally be of much more value if he knows something of the duties of a medical officer in time of action. These men will necessarily be drawn from the ranks of the Medical Society to a large extent. Whether you are of age for active service or have passed that period, it is a matter that should claim your interest, as this is your country, and the army and national defense program is approved by you through your representatives. It, therefore, come right back upon you. Each of us must play his part. You may not be able to take an active part, but you can take an active interest and help the young men who are coming on, and who so frequently appeal to the medical men for advice.

The training in camp is not without compensation, as it brings men from all parts of the coun-

try into contact and very pleasant associations are formed. Camp is of great value to the medical man as a complete and radical change of thought and work, and hence a most valuable vacation. His application of professional knowledge to military problems starts unused gray matter to working and rests that which is so continually active during the other fifty weeks. We have in the Medical Reserve Corps today many of our most prominent medical men, practically all the specialties being represented. These men give much of their time and thought to the promotion of National Defense and are making a most valuable contribution to the safety of their country. I believe it the duty of every doctor of whatever age or line of practice, to be informed upon the subject of National Defense, especially as it pertains to the Medical Department, and to be ready to do his part, whatever it may be.

THE BATTLE OF STATISTICS

In a recent number of *Science* Professor C. H. Forsythe, of Dartmouth College, crosses swords with the optimists on the subject of the increase in the length of life. He says that the purpose of his paper is to "take issue with those who are so elated with results obtained in their own immediate fields leading to significant reductions, not only in certain death rates, but also in the prevalence of certain diseases, that they feel justified in predicting marvelous increases in the average length of life in the no great future." "Most of these optimistic authorities have failed to appreciate that practically all these results have been obtained in children's diseases, and very little or no attention has been given to the ages beyond the prime of life."

The writer claims that conditions in this country at advanced ages have been on the down-grade ever since the first mortality records were established, and we have now reached such a pass that all the great gains at the early ages are already more than offset by the losses at advanced years. In brief, he considers that he can show that the average length of life in this country is now actually decreasing. "It is most momentous and almost inconceivable that a civilized and even a highly prosperous nation should have a decreasing average length of life." This sad news has been echoed from some of the insurance companies, showing that in the older age groups no prolongation of life was observable. The great decline at advanced ages is concentrated about age 70, although it extends as far back as the age 40, according to Professor Forsythe.

"The whole picture points consistently and inevitably to a future of a declining length of life until the American adult wakes up to the fact that the odds are at present heavily against his living as long as his father or grandfather." Some will say that this is all the natural consequence of the great migration to the cities; others, that life has become too fast and strenuous and that we do not yet know how to adjust ourselves to such a life. To physicians the great problem will loom as one of relieving strain upon the heart or conquering cancer, but little will be accomplished until the American adult himself is duly informed and made to realize that he is in the midst of a losing fight and that the situation will continue until he applies himself energetically to be superior to his environment. Medical authorities can be depended upon to care for the children and their diseases, but they have little or no chance to interfere with the lives of adults. There is surely no worse influence than that wielded by the well meaning individuals who go around airing their ill-founded beliefs that all is going well and before long everybody is going to live 75 or 100 years.

All this in July 26, 1929, but in the September 13th number of the same magazine, Mr. J. D. Ryan, of San Francisco, in rebuttal, states that "mortality statistics are not a satisfactory basis for such generalizations." "The great reduction in infant mortality and in deaths from communicable disease in recent years has postponed death to the later years, and the lives thus prolonged are usually sustained at diminished vitality." It is reasonable to expect that the average general health of the community has been diminished, and the average death rate during subsequent years is increased by these extended lives. If a substantial number of these previously short lives has extended to 40 and 50, the average age of death of all persons passing the age of 40 is also reduced, and the ratio of the number of persons reaching the age of 50 to the total population will also be reduced. The increasing mortality due to certain organic diseases is frequently referred to in current discussions as indicating a greater susceptibility induced by changes in our manner of living or by the devitalizing influence of organic stresses incident to more strenuous activities. "There is absolutely no foundation in fact or experience for such beliefs." More people escape death by infections than formerly, but as all of us ultimately die, it is inevitable that there should be a corresponding increase in the number of deaths from other causes. We have reason to expect a continued reduction in mortality from tuberculosis, typhoid, and other prevalent diseases in the future which should appreciably prolong the average span of life. "As many of these lives will be terminated later by cancer and diseases of the heart, it would be absurd to draw alarming inferences from subsequent statistical reports showing increased deaths from these causes." —Campaign Notes, Am. Soc. Control of Cancer., Sept., 1929.

MULTIPLE SCLEROSIS: A CLINICAL REVIEW AND FOLLOW-UP STUDY*

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ACCORDING to available knowledge, multiple or disseminated sclerosis is, fortunately, a rare disease, afflicting about eight to ten persons in each 100,000 of population. Except in breadth of clinical knowledge, little more is known of this disease than in the days of Cruveilhier (1835) and Carswell (1837). The pathologic end-products of the disease seem clear; the pathologic changes earlier in the disease may not be so well understood. The theories of etiology are numerous, but deal for the most part with primary degeneration, and infection or inflammation.

In a survey of some of the clinical facts of the disease, including the course and outcome, information was obtained about patients studied at The Mayo Clinic between January 1, 1915, and January 1, 1928, on whom a clinical diagnosis of multiple sclerosis had been made by a consulting neurologist. Most of the information was obtained in response to a series of questions sent to patients. A few patients returned for reëxamination. The home physicians of a few were kind enough to send detailed reports. From these combined sources, a follow-up study was obtained from 529 patients, which is slightly more than half of those on whom a diagnosis of multiple sclerosis was made in the period designated. An attempt is not made to give the incidence, variety, or sequence of symptoms and signs in this group during their course. It should suffice to say that a disease which produces multiple lesions or plaques of sclerosis or fibrosis in various parts of the central nervous system, more especially in the white matter, can produce a great many and varying combinations of symptoms, among which one may see the triad of Charcot: scanning speech, intention tremor, and nystagmus. As a matter of interest, certain comparisons will be made between this group and a large group of patients who have had epidemic encephalitis.†

These patients came, for the most part, from Minnesota and adjoining states and provinces. Evidence for hereditary transmission of the disease is meager. However, in seven cases there was apparently a similar disease in near relatives. In five cases a brother or sister had a like disease. In one case the father of the patient probably had multiple sclerosis. Several members of one family had a syndrome that was much like multiple sclerosis. The sexes seem about equally affected; there were 277 males and 252 females in this group, making the ratio of males to females 1.1:1 (the ratio of males to females is 2.5:1 in epidemic encephalitis, and 2.8:1 in paralysis agitans so diagnosed prior to 1917.) The disease had an insidious onset in 456 cases (86.2 per cent), which is in strong contrast to epidemic encephalitis, in which the history of an acute onset was elicited in 84.8 per cent of a large group of patients studied. The disease makes its appearance most frequently in the second and third decades of life. There are well authenticated cases in which the onset was in infancy or early childhood, and also in well advanced years. The data of the age of onset for this group are presented in Figure 1.

The disease may make its appearance at any season of the year, but I have felt that the onset, and recurrences, are more frequent in spring and early summer. The seasonal variations in the following case are of interest.

Case 1.—A man, aged twenty-three years, came to The Mayo Clinic in November, 1927, complaining of difficulty in walking, which first had made its appearance in April, 1918, and which had progressed to almost complete paralysis of the lower extremities in two weeks. His hands also had been weak and numb. There had been some loss of sphincteric control. Within six weeks from the onset, he had improved markedly and had been up and about, but had known his arms and legs were not right. In January, 1920, within two weeks of the onset of the trouble, he again had become even more paralyzed than he had been in April, 1918. There had been complete loss of sphincteric control. By June or July, 1920, he had been walking, but his legs had been stiff. Each year since, usually in April and November, he had had marked exacerbations in his inability to walk or to control his sphincters. These

*Read before the Minnesota Neurological Society, Rochester, Minnesota, June 8, 1929

†Ziegler, L. H.: Follow-up studies of persons who have had epidemic encephalitis. Jour. Am. Med. Assn., 1928, xci, 138-141.

spells had lasted for a few weeks. His condition had become much worse two weeks before he came to the clinic. He had had difficulty in controlling his bladder and rectal sphincters.

Examination at the time of the patient's appearance at the clinic revealed the following: both vertical and horizontal nystagmus, bilateral signs of lesions of the pyramidal tract in arms and legs, ataxic and spastic gait, slight incoördination of arms and hands, absence of

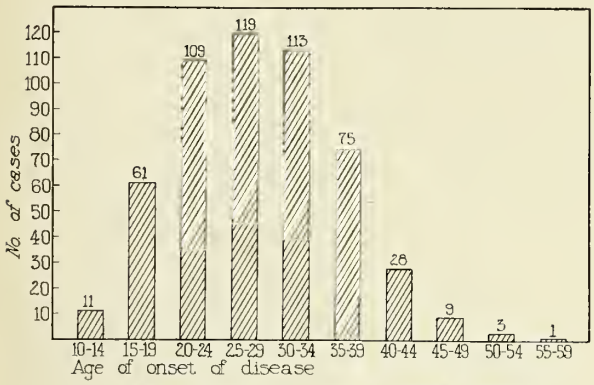

Fig. 1. Age of onset in 529 cases of multiple sclerosis.

left lower abdominal reflexes and some loss of joint and vibration sense below and including the crests of the ilia. Bladder and rectal sphincters were poorly controlled. Examination of the spinal fluid disclosed five cells in each cubic millimeter, a negative Wassermann reaction, a negative test for globulin, and prompt response to compression of the jugular veins, with slow return to normal.

That the symptoms of the disease tend to undergo remission and recurrence is common knowledge. Complete remission of all symptoms would seem to be rare, but it does occur. On the other hand, complete remission of any one symptom or sign is not unusual. Remissions may be striking. A patient may become nearly helpless, and within a short time his condition may return almost to normal and he may be able to work. A patient is likely to praise any remedy which he happens to take during a remission and to condemn one taken while a recurrence is in progress. As a rule, remissions become less and less complete and recurrences more and more pronounced. These facts make the evaluation of treatment difficult. That long remissions do occur is illustrated by the following case.

Case 2.—A married woman, aged forty-nine years, came to The Mayo Clinic in 1925 on account of paralysis of the lower extremities of four years' duration. She had married at the age of twenty-four years and had had three children, who were entirely well. At nineteen years of age the entire right side of the body had been numb for four or five months. She had not been able to write with the right hand; it had been tremorous. She had been unable to speak clearly. She had recovered so far as subjective symptoms had been concerned and had been well until the age of thirty-four years, when, during the month of May, she had begun to drag the left leg, and both legs had become numb. She again had recovered and had been well until the age of forty-five years, at which time the legs and feet had become heavy and weak and the abdomen had felt as if a band were tied about it. The lower extremities have become increasingly more spastic and useless. She has had incontinence of the bladder at times since the age of forty-eight years.

Examination at the clinic revealed all types of nystagmus, marked weakness, and slowness and spasticity of the lower extremities, making walking impossible. She had marked loss of joint and vibration sensibility in the lower extremities and slight loss in the arms. There was absence of the abdominal reflexes, and signs of lesions of the pyramidal tract could be elicited in the right hand and in both feet. The Wassermann reaction of the spinal fluid was negative and the fluid contained many erythrocytes, probably introduced at the time of puncture.

A common precursor of the disease is fatigue and a state of reduced capacity to work, which may exist for a few weeks to several years before more specific symptoms or signs make their appearance. Fatigue and reduced capacity for work also are present in many cases during the so-called remissions. These symptoms often lead to a diagnosis of neurasthenia. It is often possible, although not always easy, to collect enough evidence by a thorough neuropsychiatric examination to distinguish between the fatigue as an expression of psychobiologic inadequacy and that due to disease of the nervous system. The earliest symptoms or signs noticed by these patients are recorded in Table 1.

In more than 20 per cent of the cases the first symptom noticed was weakness, awkwardness, or inability to use the legs properly in walking. This symptom led many patients to consult orthopedists to see if "broken arches" or other disease of the bones and joints might not be the cause of the symptom. Those who complained of numbness, tingling or paresthesia of the lower extremities not infrequently assumed their trouble to be "rheumatism" and were often treated for this condition. Although pain is not a common symptom at the onset, it is not uncommon in the subsequent stages of the disease, when increased muscular tone and contractures are doubtless the cause of distress. Although a few patients consulted neurologists early because of fear of paralysis, general practitioners of medicine and orthopedists doubtless see many

TABLE 1

EARLIEST SYMPTOMS OR SYMPTOMS AT ONSET NOTED BY 529 PATIENTS WITH MULTIPLE SCLEROSIS

	Cases
Motor disturbance, both lower extremities*	116
Motor disturbance, right lower extremity	52
Sensory disturbance, both lower extremities**	50
Defective vision (blurring)	44
Motor disturbance, left lower extremity	34
Diplopia	32
Sensory disturbance, right upper extremity	20
Sensory disturbance, both upper extremities	17
Motor disturbance, right upper extremity	15
Sensory disturbance, all extremities	15
Sensory disturbance, left upper extremity	15
Loss of control of sphincter of bladder	14
Sensory disturbance, right lower extremity	13
Motor disturbance, both upper extremities	9
Motor disturbance, right upper and lower extremities	9
Sensory disturbance, left lower extremity	9
Motor disturbance of all extremities	8
Vertigo	7
Sensory disturbance, left upper and lower extremities	7
Difficulty in talking and swallowing	5
Motor disturbance, left upper extremity	4
Motor disturbance, left upper and lower extremities	4
Sensory disturbance, right upper and lower extremities	4
Rectal incontinence	4
Sexual impotence	3
Sudden loss of hearing in one ear	2
Sensory and motor disturbance, right lower extremity	2
Sensory and motor disturbance, both lower extremities	2
Motor disturbance, left upper and right lower extremities	1
Sensory disturbance, right upper and left lower extremities	1
Motor disturbance, right lower extremity; sensory disturbance, both lower extremities	1
Motor and sensory disturbance, left lower extremity	1
Motor and sensory disturbance, right upper extremity	1
Motor and sensory disturbance, all extremities	1
Sensory disturbance, right side of face	1
Weakness, right side of face	1
Weakness, left side of face	1
Girdle sensation	1
Motor disturbance, right upper extremity; sensory disturbance, right lower extremities	1
Tinnitus	1
Frequent fainting	1
Total	529

*Loss of control, awkwardness and weakness.

**Tingling, numbness, prickling, pain, burning, "electric sensations," and so forth.

patients with multiple sclerosis before neurologists see them. It behooves orthopedists, especially, to be familiar with this syndrome to prevent misdirected treatment and faulty prognosis.

Defects in vision, such as diplopia and central scotoma (resembling retrobulbar neuritis), constituted the symptoms at onset in 14.4 per cent of patients in this group. In the course of the disease, a much larger proportion of patients have symptoms referable to the eye. This fact makes it essential for ophthalmologists to have a thorough understanding of the disease. Likewise, the urologist can solve some worrisome problems for himself if he keeps in mind that the symptom of onset in a few cases of multiple sclerosis is loss of control of the bladder sphincter.

Two patients experienced sudden loss of hearing in one ear. Seven had fairly severe vertigo. The eighth cranial nerve is involved much less frequently than the second. Weakness of facial muscles was observed twice in this series, necessitating differential diagnosis between Bell's palsy and multiple sclerosis. In a few cases, objective sensory changes were such as to make the exclusion of tumor of the spinal cord difficult. In such cases, careful studies of spinal fluid and especially of pressure, by accurate methods of measurement, are of greatest importance. Although hemiparesis or hemiplegia may occur with multiple sclerosis, it is apparent from the data in Table 1 that these are so infrequent as to make it imperative to rule out other diseases before attributing them to multiple sclerosis.

Circumstances or diseases which patients associated with the onset of their condition are given in Table 2.

The onset is associated with pregnancy and parturition in many cases. Although these conditions cannot be regarded as causes in the present state of our knowledge, they favor the progress or development of multiple sclerosis. The same might be said of influenza. In the matter of injury it is difficult to separate cause and effect, especially in view of the medicolegal possibilities that develop subsequent to the appearance of a disease intimately associated with an accident or injury. The most that one could say is that a vast number of victims of accidents never have multiple sclerosis. The association of lethargic encephalitis with multiple sclerosis, in two cases, may be accidental and should not be regarded as of etiologic significance without

TABLE 2

DISEASES OR CIRCUMSTANCES WITH WHICH PATIENTS ASSOCIATED THE ONSET OF MULTIPLE SCLEROSIS

	Cases
Pregnancy, childbirth, miscarriage	25
Influenza	22
Injury to various parts of the body	22
(electric shock in 1 case)	
Acute illness, unnamed	9
(fever, headache, malaise)	
Common colds	4
Diarrhea	4
Smallpox	4
Mumps	2
Tonsilitis	2
Epidemic encephalitis (lethargic form)	2
Osteomyelitis	1
Diphtheria	1
Neuritis	1
Infected teeth	1
Alcohol (excessive use)	1
Septicemia	1
"Milk leg"	1
Sore eyes	1
Thyroidectomy	1
Herpes	1
Acute rheumatic fever	1
Arsenic or lead poisoning	1
Swelling of feet	1
Miner's nystagmus	1

much more opportunity to study the pathologic changes in both diseases.

Actual syndromes of disease found in association with multiple sclerosis are presented in Table 3. That patients with multiple sclerosis are often euphoric and happy, out of all proportion to the nature of the profound disabilities which may be present, is a frequent observation and probably accounts for the confusion of this disease with hysteria in some cases. It is not surprising, therefore, that psychosis, especially of the manic-depressive type, occurs among them. On careful clinical analysis, this fact may prove to be more than mere accident or coincidence. The other diseases found associated may be coincidental.

Of 529 cases in which data were obtained, death has occurred in 136 (25.7 per cent). The average period from the onset of the disease until death is slightly more than seven years in this group (in 112 cases in which data could be obtained). Although data from necropsy are available in only a few of these cases, the clinical causes of death, as far as could be determined, are recorded in Table 4.

TABLE 3

SYNDROME ASSOCIATED WITH MULTIPLE SCLEROSIS*

	Cases
Psychosis	6
(chiefly manic-depressive)	
Grand mal	2
Diabetes mellitus	2
Trifacial neuralgia	2
Paroxysmal tachycardia	1
Hemorrhagic purpura	1
Aplastic anemia	1
Psoriasis	1
Duodenal ulcer	1
Endocarditis	1
Asthma	1
Thalamic pain syndrome	1
Hysteria	1

*Foci of infection, such as are found in teeth, tonsils and the prostate gland, in these patients, would seem to be about the same as in any other group of patients of the same age without multiple sclerosis.

TABLE 4

CLINICAL CAUSES OF DEATH

	Cases
Unstated	60
Multiple sclerosis	37
Pyelonephritis	7
Pneumonia	5
Chronic septicemia	5
Influenza	3
"Stroke"	3
Malignant growth	3
Operation (during or soon after)	3
Heart disease	2
Acute intestinal obstruction	2
Tuberculosis	1
Strangulation	1
Convulsions	1
Hyperpyrexia	1
Accident	1
Suicide	1
Total	136

In a few cases, the cause of death could not be definitely determined at necropsy. It would seem probable that pyelocystonephritis might be the cause of more deaths. Septicemia from decubital ulcers occurs. Pneumonia from aspiration of food into the bronchi occurs in a few cases. The profound debility which develops in some of the cases favors intercurrent infection.

The results of examinations of spinal fluid vary somewhat, depending on technic. Probably the cell count, regardless of type of cell, would be subject to less deviation than any other test. In Table 5 are given the number of cells in each cubic millimeter of spinal fluid and the number of years from the onset of the disease until the

TABLE 5

INCIDENCE OF VARIOUS CELL COUNTS OF SPINAL FLUID IN 345 CASES OF MULTIPLE SCLEROSIS

Years from onset	Cells in each cubic millimeter of spinal fluid (one spinal puncture for each patient)																																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	24	25	26	27	28	29	30	34	35	44	46	103
1	7	6	6	7	7	3	5	1	1	4	2	3		2	1			1		2		2	1	1			1			1		1	
2	11	4	4	2	3	6	1	1	1		1	2		3	2	2													1		1		1
3	7	7	7	2	3	2	3	3	1	1			1				1	1		1	1												
4	6	3	5	1	7	1	3		2	1			2		1		1	1	1					1	1	1							
5	9	2		1	1	2	2	1					1	1		1			1	1								1	1				
6	3	1	2	2	2		3	2			1		3	1			1																
7	6	4		2	1	4			1																								
8	4	1	2	3	1		2	1		1				2	1				1				1										
9	2	2	1	1	1	3													1														
10	4			1		1	2				1		1		1	1			1														
11	2	1	1						1																								
12	2				3			2				2				1																	
13		1	1		1																												
14	2	3		1		1											1																
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21	1																																
22	1																																
23					1																												
24	2																																
26	1																		1														
Total	74	38	29	26	31	24	23	11	7	7	5	7	8	9	6	6	4	3	6	4	1	2	2	2	1	1	1	1	2	1	1	1	1

lumbar puncture was done. Puncture was done once only in each case. It will be observed that in a few cases the cell count was high many years after the onset of the disease, and also that it was low or normal soon after the onset of the disease. Data concerning cell counts taken frequently during the long course of cases of multiple sclerosis are needed.

The data relative to clinical course and occupational disability are given in Figures 2 and 3.

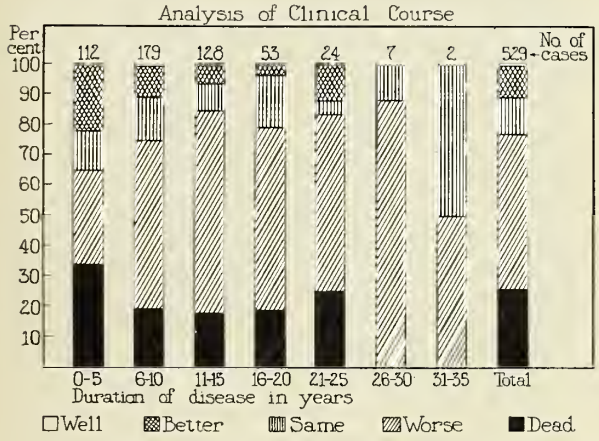

Fig. 2. Clinical course in 505 cases of multiple sclerosis.

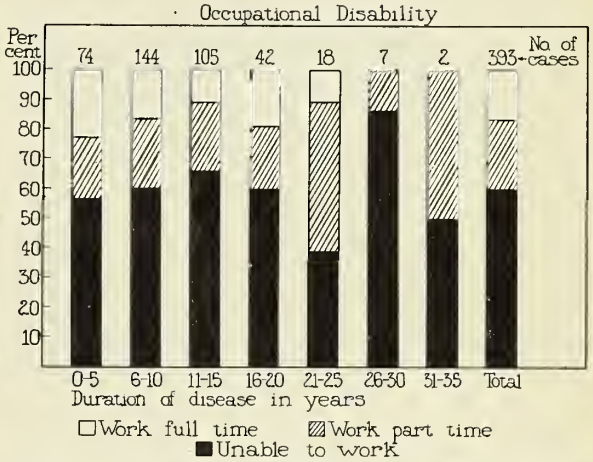
Occupational Disability
Per cent
No. of cases
74 144 105 42 18 7 2 393
0-5 6-10 11-15 16-20 21-25 26-30 31-35 Total
Duration of disease in years
Work full time
Work part time
Unable to work

Fig. 3. Occupational disability in 393 cases of multiple sclerosis.

Multiple sclerosis is for the most part a progressive disease. There are probably not less than 10,000 victims of the disease in the United States alone. Most of them, in the prime of life, are by their disease denied the privilege of economic usefulness. They not only are unable to work much, but spend what they have saved, or use the funds, time, and energy of their friends and relatives in seeking possible relief. Such are the purely economic aspects of the disease, to say nothing of the annoyances and personal discomforts of this small army of afflicted persons.

Treatment is based on trial and error. The etiology of the disease needs first to be discovered, after which treatment may be put on a rational basis. Typhoid vaccine, sodium cacodylate, salvarsan, compounds of silver, hydrotherapy, heliotherapy, rest, and good general care, all have their devotees and may be justified to keep hope alive. There is no remedy at present that one can turn to with assurance that it will arrest or retard the disease. The chief encouragements to be offered to patients are that progression may be slow, that the disease, in a few, may become arrested, and that long remissions are possible. The combined efforts of economic and scientific forces should be enlisted to the end of eradicating this among other diseases.

SUMMARY

Five hundred twenty-nine patients with multiple sclerosis were traced—and their clinical course reviewed.

Evidence for hereditary transmission is meager. The sexes seem to be about equally affected. The disease is usually insidious in onset and makes its appearance chiefly in the second and third decades of life. A season of onset is not definitely established.

Remissions of single symptoms and signs are common. Remissions of all symptoms and signs are rare. Striking and long remissions occur.

The most frequent symptoms of onset are motor or sensory disturbances of the lower extremities, and visual disturbances, including diplopia and central scotoma.

The patients associated the disease mostly with pregnancy and parturition, but a number also associated it with injury.

Patients with multiple sclerosis often have emotional disorders and are euphoric and happy in contrast to what one would expect from the severity of the disability.

Clinical causes of death, so far as they could be determined, were pyelonephritis, septicemia, pneumonia and intercurrent infection.

The disease is progressive and very disabling. The etiology, thus far, is not established. Treatment is based on trial and error and the results of some methods of treatment are hard to evaluate because of the nature of the disease. Occasionally the disease appears to become arrested, and long remissions occur.

CASE REPORTS

PRIMARY BILATERAL ADENOCARCINOMA OF THE BREAST*

REPORT OF CASE

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According to Deaver and McFarland "bilateralism in cancer of the breast is uncommonly met with, but in a majority of instances the process in one breast is secondary to a primary nodule in its fellow of the opposite side. Simultaneous involvement of both organs is extremely rare." These observers have noted eleven cases of bilateral carcinoma of the breast in 200 cases. Poulsen noted eleven cases in 355, and Schwarzkopf noted five cases in 323. Deaver and McFarland believe that bilateral tumors of the breast are more commonly benign than malignant although they do not agree with Primrose that bilateral tumors are usually benign. The case we are reporting here is one of simultaneous bilateral adenocarcinoma of the breast.

REPORT OF CASE

A woman, aged sixty-eight years, mother of seven living children, came to The Mayo Clinic first in 1924, because of attacks of vomiting. A diagnosis was then made of atypical anorexia nervosum and the patient was advised to return home. She came to the clinic a second time five years later complaining of insomnia and breathlessness of about four years' duration. She had had thrombophlebitis of one leg two years before her second visit and many years before she had had a minor plastic operation on the cervix.

The patient was florid, moderately obese, 5 feet 3 inches in height, and weighed 171 pounds. The systolic blood pressure was 180 and the diastolic 120 mm. of mercury. The pulse rate was 80. The heart was slightly enlarged (graded 1). Exertion caused dyspnea and mild cyanosis. Unknown to the patient a single tumor was present in each breast; they were associated with slight dimpling of the skin. The tumor of the right breast was in the upper outer quadrant and was approximately 3 cm. in diameter. In the left breast the tumor was just above the nipple, and was about 2 cm. in diameter. The results of roentgenologic examination of the chest were negative. The specific gravity of the urine was 1.015; it did not contain albumin, but there were 10 pus cells to a low power microscopic field.

A diagnosis was made of myocardial degeneration with loss of compensation and ascites, probably on the basis of the former hypertension; and bilateral tumors of the breast. It was decided to send the patient to a hospital for treatment of the cardiac disorder; if relief was obtained the tumors of the breast were to be excised and, if they proved to be malignant, radical amputation of the breast would be performed immediately. In the hospital the patient was given 8 grains of ammonium nitrate, three times a day with salyrgan (1 c.c. intravenously every third day) to combat ascites. The fluid intake was limited. After three weeks of treatment the patient was so much improved that she was dismissed from the hospital and allowed to go home for two weeks before the operation was performed.

With the patient under ether anesthesia the nodule in the right breast was excised and examined immediately, by means of fresh frozen sections. Adenocarcinoma, graded 3,[1] was found and radical amputation of the breast was performed. Convalescence was uneventful. Ten days later the patient was again anesthetized and the nodule from the left brest removed. The tissue was examined immediately and diagnosis made of adenocarcinoma graded 4.[1] Radical amputation was performed at once. Convalescence was again uneventful.

Pathologic Data.—Although the two carcinomas were similar in some respects they were obviously two different kinds of growths. The carcinoma from the right breast was composed of many acini filled by round or oval cells, which Broders has recently come to believe is a sign of a high degree of malignancy, in contradistinction to acini composed of cells with a tendency to columnar form.[2, 8] The nuclei of these cells were not large or conspicious and mitotic figures were infrequent (Fig. 1).

From a microscopic standpoint three chief features were noted concerning the carcinoma of the left breast: (1) solid areas of round or oval carcinoma cells with ill-defined acinar arrangement; (2) well formed acini lined by a single or double layer of cuboidal to oval-shaped cells, and (3) areas in which a single layer of carcinoma cells grew between fibrous connective tissue and was apparently compressed by it (Fig. 2). None of the lymph nodes removed gave evidence of metastasis. The single areas mentioned were the only foci of carcinoma in either breast.

COMMENT

In this case, as in every one of suspected adenocarcinoma of both breasts, there are two questions to be decided: (1) Is this a true case of two separate neoplasms, one in each breast? (2) Is one lesion metastatic?[3, 4] There are several points in favor of an affirmative answer to the first question. The tumors occurred at approximately the same time, and were of about the same size. They were not in the usual situation for the occurrence of gross metastasis from one

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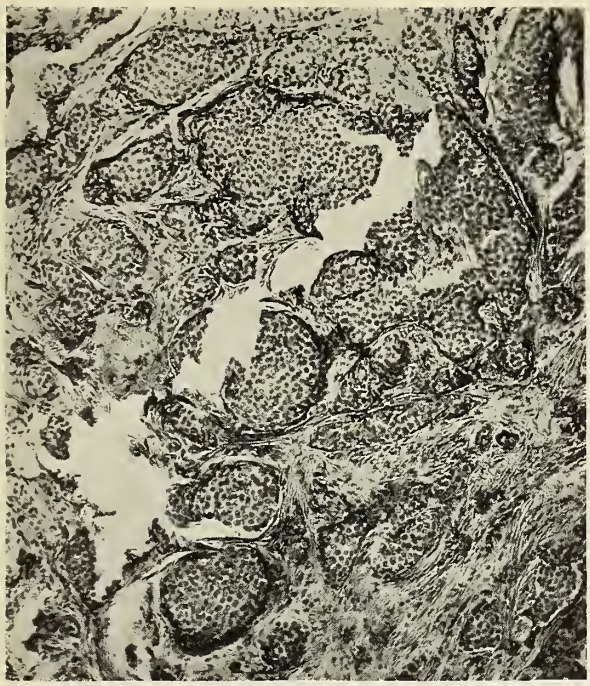

Fig. 1. Adenocarcinoma, graded 3; the chief characteristic is the acini filled with round or oval cells containing small nuclei (x75).

Fig. 2. Adenocarcinoma, graded 4. In the upper third of the section acini are composed of a single or double layer of round or oval cells. In the middle third of the section some of the carcinoma cells are arranged single file with much fibrous connective tissue between, whereas in the left upper corner and in the lower third of the picture malignant cells are arranged in more solid areas with less connective tissue between (x75).

breast to another, since the most common site of metastatic new growths is in the inner half of the breast, whereas these lesions were in the upper outer quadrant, and near the center of the breast a little above the nipple. The difference of the grade of malignancy is another point in favor of the bilateral origin of the tumors, for metastatic neoplasms tend to maintain the same degree of malignancy as the original lesion.[2, 5] Finally it is worthy of emphasis that the axillary lymph nodes were not involved by either tumor; this is additional evidence that the lesions were independent, since neither had apparently shown a propensity to metastasize.

The strongest argument against the bilateral origin of the tumors is the fact that metastatic carcinoma is the most common bilateral malignant neoplasm in the breast; however, these bilateral lesions most frequently develop in the second breast after amputation of the first.[3, 4]

The case reported here again illustrates the significance in surgical diagnosis and treatment of carefully investigating all tumors of the breast and of adequate treatment immediately after a definite diagnosis has been established.

BIBLIOGRAPHY

1. Broders, A. C.: The grading of cancer and its practical application. Arch. Path. and Lab. Med., 1926, ii, 376-381.
2. Broders, A. C.: Personal communication.
3. Caylor, H. D., and Hunt, V. C.: Bilateral adenocarcinoma of the breast. Ann. Surg., 1929, lxxxix, 549-551.
4. Deaver, J. B., and McFarland, Joseph: The breast, its anomalies, its diseases and their surgical treatment. Philadelphia: P. Blakiston's Son and Co., 1917, p. 531.
5. Frater, Kenneth: Study of epithelial neoplasms of the urinary bladder. Jour. Urol., 1928, xx, 371-386.
6. Poulsen, K.: Die Geschwülste der Mamma. Arch. f. klin. Chir., 1891, xlii, 593-644.
7. Primrose, A.: Breast tumors, with special reference to carcinoma. Am. Jour. Med. Sci., 1912, cxlv, 100-115.
8. Rankin, F. W., and Broders, A. C.: Factors influencing prognosis in carcinoma of the rectum. Surg., Gynec. and Obst., 1928, xlvi, 660-667.
9. Schwarzkopf, Ernst: Zur Statistik des Brustkrebses. Beitr. z. klin. Chir., 1912, lxxx, 317-356.

LARGE INFECTED SOLITARY CYST OF KIDNEY*

REPORT OF CASE

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Suppuration in a solitary cyst of the kidney is so very rare that every case is of interest and merits being put on record. In a hurried and most probably incomplete search of the literature I have been able to find one other case only, although more and more cases of solitary serous cysts are being reported, the number now on record approaching 200 in all.

This other single case was reported by Patel and Mallet Guy in the French Journal of Urology of April, 1925. They failed to find any other cases prior to theirs and make statement that "the classical authors do not say anything about suppuration of large serous cysts, and recent reports by Brin (1911) and Kretschmer (1920) do not give any cases." Their patient was a woman, twenty years old, married and mother of one child. She had had no urinary symptoms during her pregnancy, and had been perfectly well up to one week before. She then developed sudden pain in the left hypochondrium, with a temperature of 104.4° F. (40.2° C.). There was a painful spot with rigidity and tenderness in the left costolumbar angle, but no mention is made of any tumor at this first examination. The next day, June 3rd, a distinct swelling could be felt in the lumbar region, and this apparently increased very rapidly, for, in the next twenty-four hours, it was described as large, descending below the umbilicus and reaching in front to the mammillary line. It showed renal ballottement and seemer to fluctuate. Some pus was present in the urine. A diagnosis of suppuration, probably renal in origin, was made. Incision revealed a retroperitoneal pocket in front of the kidney, from which about a liter of pus was removed. The renal artery was injured during the operation, necessitating nephrectomy. The patient rapidly recovered and left the hospital in a month. The specimen showed the kidney to be normal except for the very large cyst which sprang from the anterior surface and which was in no way connected with the calyces or renal pelvis. A diagnosis of cyst was not made until after examination of the specimen removed. The rest of the kidney parenchyma was intact and there were no other cysts. Section of the cyst wall indicated acute inflammation, but no bacteria were found in the pus.

CASE REPORT

Miss A. N., twenty-two years old, single, a University student, a patient of Dr. Larry O. Doyle, was admitted to St. Mary's hospital Sept. 16, 1927.

Family History.—No bearing on case.

Previous History.—She had always been healthy, but, as a child in school, was proud of the fact that her "stomach" was more prominent than other children's. One year ago she complained of pain on urination with burning more intense afterwards and a stinging pain in right lumbar region. There was pus in her urine and a diagnosis was made of pyelitis due to "cold." The discomfort passed away and she was well until ten days before admission (Sept. 16, 1927), when the urinary symptoms returned. These, however, were mild and did not prevent her from climbing the mountains in Glacier Park.

Present Illness.—On September 14 she left Montana in apparently good health. About noon on September 16, while still on the train, she became nauseated and began to suffer pain in the right upper abdominal quadrant, extending down to the umbilicus and around to the lumbar region, but not to the bladder. She was nauseated but did not vomit. At St. Cloud she left the train and came to Minneapolis by auto, arriving about 11 P. M. On admission she was in considerable shock, with a pulse rate of 160, and a temperature of 99 degrees F. A catheterized specimen of urine contained a small amount of pus, and this, with the previous history, made the tentative diagnosis of acute pyelitis plausible and probable. The next morning she was somewhat better and a more careful and complete examination was made. The pulse had dropped to 120-130, temperature 101 degrees. A leukocyte count showed 32,000. The abdomen was moderately distended throughout, but in the right upper quadrant just external to the usual position of the gallbladder there was a tense, bulging, very tender swelling, about 6 or 8 cm. in diameter, extending to, but not below, the umbilicus level, and to the right, reaching the upper lumbar

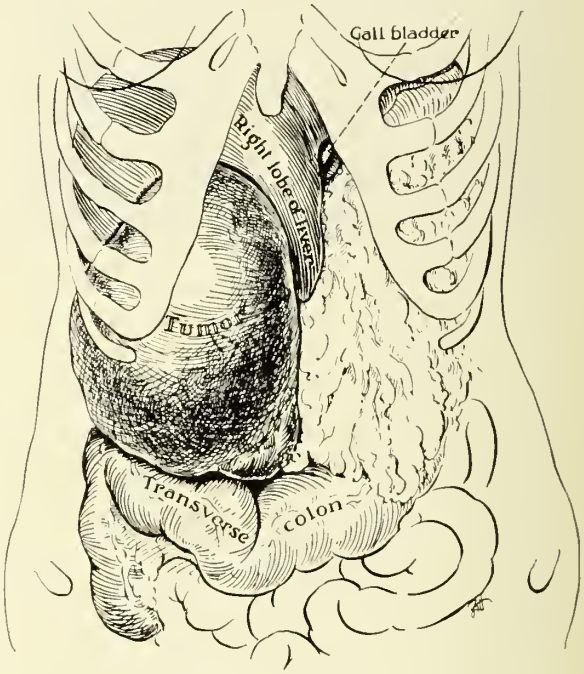

Fig. 1. Sketch made of abdomen when opened.

*Presented before the Minneapolis Surgical Society, December 6, 1928.

region, where it was indefinitely felt. Only over this mass were the abdominal muscles rigid. Upwards it seemed to be merged into the liver but auscultatory percussion showed it to be distinct from that organ. A fluoroscopy of chest and abdomen gave no diagnostic assistance, but unfortunately no films were made. She was seen in consultation by Dr. Barron on the 17th and by me on the evening of the 18th.

Diagnosis.—The diagnosis was undecided except as to the presence of pus. Four possible conditions were considered, none of which, however, quite fitted in with the clinical and physical signs.

1. Empyema of the gallbladder. Against this was the fact that the swelling did not travel toward the umbilical region as such large gallbladders usually do. Also it seemed to be too indefinite and not well circumscribed.

2. Abscess of the liver. Against this was the fact that auscultatory percussion showed it to be distinct from the general liver dullness.

3. Appendiceal abscess from rupture of a high lying appendix. I had operated on one such case in a young child, but here there seemed to be too little rigidity and tenderness for such severe clinical symptoms as were present.

4. Retroperitoneal abscess connected with the kidney. Against this was the position of the swelling, projecting the anterior abdominal wall forward, lying toward the midline, and not projecting posteriorly.

We all considered the condition as something quite unusual, and this is not to be wondered at, as a preoperative diagnosis in these large solitary cysts of the kidney has seldom been made, even when not complicated by infection.

Operation.—It was decided to open over the most prominent area, and then be guided by what exploration revealed. Dr. Doyle operated with my assistance.

On opening the peritoneal cavity a strange picture presented. A large smooth very tense tumor mass, lying close under the anterior abdominal wall but covered by the posterior-parietal peritoneum occupied all the field. The liver was pushed far up under the costal arch and was not visible, but its thin anterior edge could be felt. By lifting the lower end of the incision the transverse colon was seen, lying below the umbilical line. Toward the midline a long tongue of liver tissue reached nearly to the umbilicus. The gallbladder, stomach and duodenum were not in the field and could not be located. The tongue of liver was thought to be the left lobe but the gallbladder, which should have been to its right, was not there.

Fig. 2.

The posterior parietal peritoneum was split vertically over the tumor and was easily peeled off in front, but not from the deeper parts. The tumor could not be delivered until about three pints of pus were aspirated and its tension reduced. In getting it out of its bed the thin capsule was torn and a considerable quantity of pus was discharged on the packing. At the lower inner pole of the tumor was a hard mass which later proved to be the kidney, lying rather in front of the spinal column.

The pedicle was very large, the renal vein being the size of an index finger. After the tumor was removed the tongue of liver turned out to be a thinned-out piece of the right lobe, the normal gallbladder was to its left, and the pyloric end of the stomach and the duodenum far over in the left quadrant. The spleen and left kidney were normal.

The wound was closed up to a large drain. There was very little bleeding.

The patient reacted well, was out of bed in two weeks and left the hospital at the end of a month. A late report is that she is in perfect health and back in the University.

Pathology.—The removed tumor, minus the three pints of fluid aspirated during the operation, was

Fig. 3.

still very tense, weighed 2 pounds and was 8 inches in diameter. Estimating pints as pounds, therefore, the total weight was 5 pounds or more, and the size considerably in excess of 8 inches in diameter. The tumor was bisected, and the illustration (Fig. 2) shows half of the inner wall. The cyst springs from the upper pole of the kidney, has no connection with the pelvis or calyces, and the kidney tissue is flattened out and runs up on the wall to a point. The wall is very thin in places, and in others quite thick, varying between 2 and 5 mm. Microscopic sections through the wall show an absence of epithelial lining; leukocytic infiltration shows acute infection (Fig. 3). Section through the kidney shows, grossly, normal tissue, with no evidence of any other cyst formations. Microscopically there is a nephritis.

COMMENTS

1. The cyst was present for many years and almost certainly was congenital in origin.

2. It was not a dermoid or echinococcus, but a large solitary serous cyst which had suffered acute infection shortly before coming under our observation.

3. A point of great interest would be to discover the origin of the infection. Evidently it was not from the intestine as there was no colon bacillus odor. The history of pus in the urine and the bladder irritablity preceding the acute inflammation, and the finding of acute nephritis on section points to the kidney as the possible source.

DISCUSSION

Dr. L. O. Doyle: I haven't anything to add except that this primary infection was from the throat. She had several attacks of tonsillitis and still continued to have pus in her urine after this operation, until last spring. At that time I took out her tonsils and since then she has had no pus. She had had a cold since the time she was in the mountains.

Dr. Theodore Sweetser: I would like to mention the matter of cystoscopy on this case. I think the reason for not doing a cystoscopy on this case was the condition of the patient. There was severe shock, high fever, leukocyte count of 32,000. The patient was not in a good condition. I was not the consultant in this case, but it seems to me that, had pyelography been justified by the patient's general condition, it would have been easy enough to make a diagnosis from the pyelogram. Here is a large tumor, pushing the kidney aside, the lower calyces are rather normal in shape, and in the upper end the calyx is drawn way out and the upper part is obliterated entirely. You would have had displacement, rotation and obliteration of the upper part of the pelvis by pressure. You could have said from that I think for sure that it was a retroperitoneal tumor probably of a pretty smooth contour, and probably not outside the kidney because a paranephritic abscess would not give that picture. An appendiceal abscess surely would not give a picture of that type. The question of the condition of the patient enters there and it is a matter of judgment whether the surgeon considers it safe to have cystoscopy and pyelography done.

Dr. H. B. Sweetser (closing): The patient's poor condition precluded any attempts at refinement of diagnosis. The general symptoms, with the high leukocyte and the large tender swelling, clearly demanded exploration as an emergency operation, and there could be no mistake as to the site of attack. The diagnosis was not evident till after the tumor was removed.

PERNICIOUS ANEMIA IN A BOY AGED ELEVEN

REPORT OF A CASE

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The response of pernicious anemia to liver and liver extract therapy is now recognized as being so characteristic that it has practically become one of the postulates to which the diagnosis of this condition must conform before it is accepted as being correct. This has recently been pointed out by Faber[1] in a report in which he has used such response as a means of identification and classification of severe pernicious-like anemias in a small series of infants and children. In this report he concludes that one of his cases, aged nine and a half months, showing the blood picture indicative of pernicious anemia, and having achlorhydria

1Faber, Harold K.: The value of liver extract (343) in identifying and in treating certain anemias of infancy and childhood. Am. Jour. of Dis. of Chil., 36:1121 (December) 1928.

and the characteristic response to liver extract therapy, is the youngest authentic case of pernicious anemia on record, provided that these criteria are acceptable as conclusive.

Prior to the introduction of liver in the treatment of these cases, a fair number of severe pernicious-like anemias have been reported as occurring in early childhood. In his report, Faber, reviewing these previously reported cases, calls attention to the fact that the diagnosis has been dependent entirely upon the clinical blood examination during life and the postmortem study.

It must be admitted, however, that pathologic examination has quite failed to offer satisfactory and substantiating proofs of diagnosis of pernicious anemia. In fact, the advent of liver therapy has brought about a radical change in the very clinical-pathologic conception of this disease. It is now generally conceded that the process is not an over-destruction of red blood cell elements, but rather some factor, probably associated with the liver, which retards and inhibits normal erythroblastic maturation.

Assuming this concept to be correct, one may then reason that the excess pigment found in the blood, skin, liver, duodenal contents, etc., are there, not because of over-destruction of blood, but simply because the supply of hemoglobin pigment in the body exceeds the demand in the bone marrow, in turn due to retarded liberation of blood cells. The over-mature, extreme right shift neutrophils with thinned out, stranded, and over-segmented nuclei have been described chiefly by Watkins[2] as being characteristically pernicious anemia neutrophils. It is his opinion that the presence of such neutrophils is diagnostic of pernicious anemia and that these morphologic characteristics are the result of this same process of prolonged maturation within the bone marrow.

The following case report is presented with the desire to illustrate several interesting features:

1. Pernicious anemia occurring at the age of eleven years is sufficiently rare to entitle it to special attention.

2. The comparatively greater accuracy (and withal greater satisfaction) that the therapeutic test of response to liver extract offers in place of necropsy criteria; and

3. To illustrate an unusually marked reversion of the neutrophils to the type described by Watkins as characteristic and diagnostic of pernicious anemia.

CASE REPORT

P. K., aged 11, was admitted to St. Mary's Hospital, Dec. 21, 1928, having been referred by Dr. Dan Clark of Pine City, Minnesota.

Present Illness.—On or about the first of December the patient contracted a cold. This condition "developed into an influenza," from which he seemed to be convalescing favorably until a day or two before admission. At this time the chief symptoms were pyrexia, extreme exhaustion, and shortness of breath.

Family History.—The father, mother, one brother and one sister are living and well. The father's hair turned gray in the early twenties, and, on questioning, he states that he has noticed prickling and shooting pains through his tongue, off and on, for two or three years. His blood picture, however, was entirely normal and gastric analysis showed normal acidity. Likewise, the mother's blood picture and gastric analysis were normal.

Past History.—The patient was said to have been fairly healthy as an infant and escaped the usual chil-

Fig. 1. *a.* (128.4)-(64.2) and *d.* (130.3)-(62.3) P. A. neutrophiles. *b.* (127.4)-(65.4) nucleated red blood cell. *c.* Erythrocyte.

dren's diseases, except for an attack of scarlet fever which occurred at the age of seven. Tonsillectomy was performed in October, 1927. The parents observed that the child had seemed unusually pale and weak for about one year prior to the present illness.

Examination.—In general, the child was undernourished, markedly dehydrated and of small stature. He weighed fifty-four pounds. On admission to the hospital he appeared extremely pale and completely exhausted, almost to the point of being moribund. There was marked dyspnea and considerable cough. His temperature was 103.4. The throat was moderately inflamed and much mucopurulent nasal and post-nasal discharge was present. The ears were not suppurating, but the drums were injected. The mouth was dry and much sordes appeared on the teeth and tongue. The cervical and submaxillary glands were distinctly enlarged. Examination of the lungs was negative except for occasional bronchitic râles. The heart rate was very rapid. A hemic murmur could be heard over the precordium, but there was no cardiac enlargement. At first there was much distention of the abdomen, but later a moderately enlarged spleen could be palpated. The extremities were negative and no abnormal reflexes were noted.

Laboratory Data.—Urinalysis: alkaline reaction; no albumin or sugar; only occasional leukocytes and epithelial cells present on microscopic examination. Blood: Hemoglobin (Sahli), 25 per cent. Red blood cells, 1,450,000. White blood cells, 20,100. Of the latter, 70 per cent were polymorphonuclears. The morphology of the cells on smear indicated pernicious anemia. Anisocytosis and poikilocytosis were marked. There were numerous macrocytes, many of which were polychromatophilic or loaded with basophilic granules. The cells were generally well filled with hemoglobin. A

2Watkins, C. H. "A classification of chronic idiopathic secondary anemia, with especial reference to the morphology of the blood." Jour. Am. Med. Assn., 93:1365, Nov. 2, 1929.

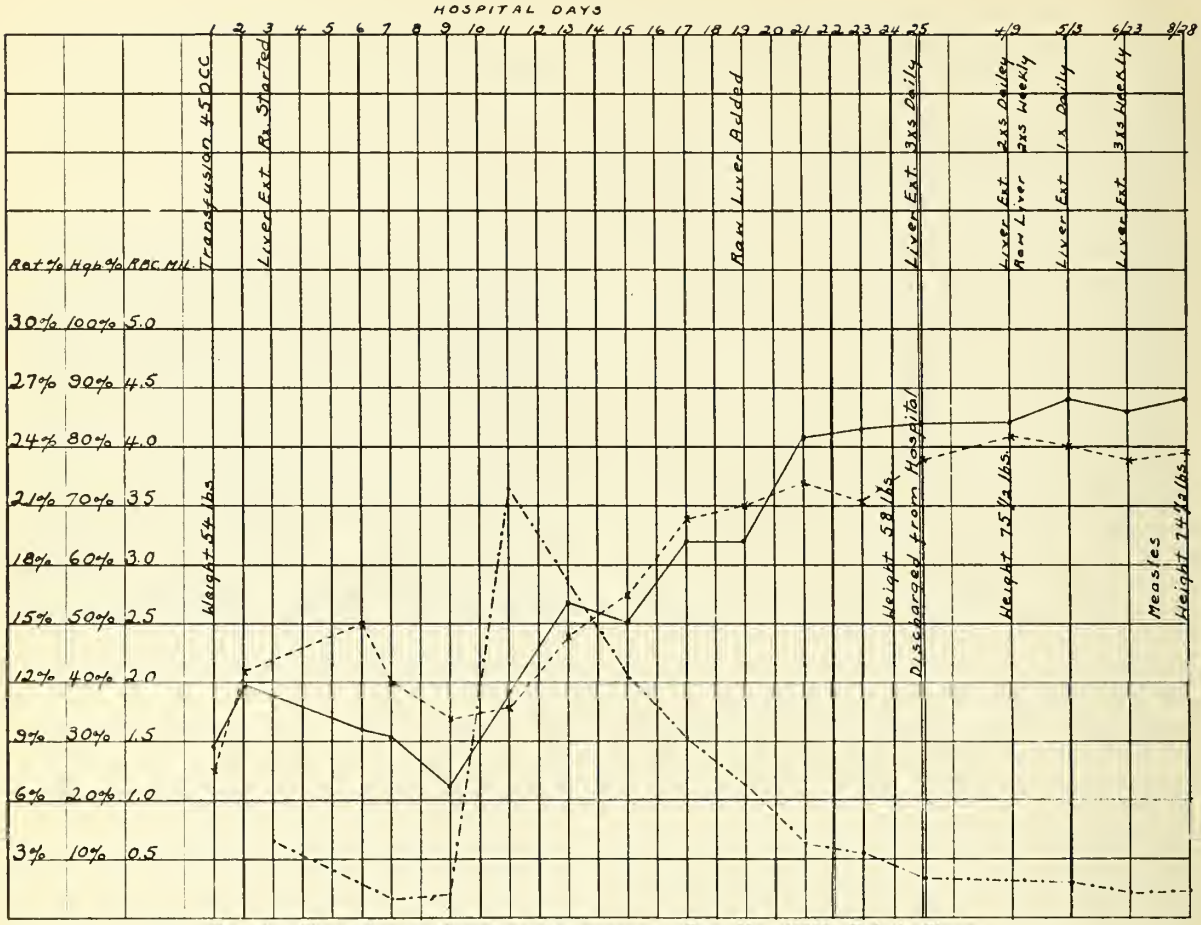
HOSPITAL DAYS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 4/9 5/3 6/23 8/28
Rat% Hgb% RBC MIL
30% 100% 5.0
27% 90% 4.5
24% 80% 4.0
21% 70% 3.5
18% 60% 3.0
15% 50% 2.5
12% 40% 2.0
9% 30% 1.5
6% 20% 1.0
3% 10% 0.5
Transfusion 450 CC
Liver Ext. Rx. Started
Raw Liver Added
Liver Ext. 3xs Daily
Liver Ext. 2xs Daily
2xs Weekly
Raw Liver
Liver Ext. 1x Daily
Liver Ext. 3xs Weekly
Weight 54 lbs.
Weight 58 lbs.
Discharged from Hospital
Weight 75½ lbs.
Measles
Weight 74½ lbs.

Fig. 2. Chart showing hematopoietic response. Case No. 63707, Duluth Clinic.
——— hemoglobin.
——————— erythrocyte count.
.—.—.—. reticulocytes.

few normoblasts and an oecasional megaloblast were noted. Many of the polymorphonuclears were rather larger than normal and showed very definite oversegmentation and stranding. Some of these nuclei contained as many as eight to ten thinned out lobules* (Fig. 1).

Progress.—Owing to the patient's precarious eondition, he was given a transfusion of 450 e.c. of citrated blood on the day of admission. The next morning there was noted a purulent diseharge from the left ear. The patient's condition seemed definitely better than on the preceding night. The blood examination following the transfusion indicated a hemoglobin of 42 per cent (Sahli), red blood eells 1,908,000, and white blood cells 12,700.

In the meantime, further evidenee and laboratory data were obtained as follows: Stools were negative to occult blood; no evidenee of ova or parasites. Blood culture showed no growth. Blood Wassermann returned negative. Fragility test showed beginning hemolysis at 0.42 and complete hemolysis at 0.32. Clot retraetion reported as very slight. Aspiration of the stomach after test meal was attempted about a week after admission, but only a very small amount of material eould be obtained; in faet, there was some doubt as to whether or not it was actually stomach eontents. This showed no free hydrochloric acid and only a weak qualitative reaction of combined acids. Examination of the vomitus on the following day, however, showed no free hydroehloric present and a combined acidity of 26.

On Dee. 25, 1928 (fourth hospital day), treatment with liver extraet was begun, using four vials (Lilly's 343) daily. A few days later the dosage was inereased to six vials with the addition of a raw liver eoektail onee daily. The diet was as general as possible and included eertain portions of meat, fruit and cooked vegetables each day. On Dee. 28, 1928, the right ear drum showed injeetion and bulging. Myringotomy was done with free purulent diseharge now eoming from both ears.

The hematopoietic response to the above treatment can best be appreeiated by noting the aeeompanying chart (Fig. 2) with attention to:

(1) The transient response to the blood transfusion.

*A later slide was examined by Dr. Charles Watkins of the Mayo Clinic in which he noted one neutrophil having 14 distinct lobulations. He stated in a personal communication that the morphology of these cells was diagnostic of pernicious anemia and that the smear represented the most extreme instance of right shift neutrophils that he had ever seen.

(2) The sharp sudden rise in the reticulocyte count occurring on the seventh day of liver treatment and the gradual decrease coincident with the rise in the hemoglobin and the red blood cell count towards normal.

(3) The somewhat late reticulocyte response (probably the transfusion and the severe infection were factors in delaying this).

Coincident with the clearing up of the infection the temperature gradually dropped to normal, and the child's appearance improved accordingly. Before any appreciable effect was noted in the blood counts themselves, a very obvious change in the patient's general attitude, appearance and appetite became noticeable very soon after beginning the administration of liver extract. This improvement continued, and at the time of the patient's discharge from the hospital on the twenty-fifth day, he was able to be up and about with ease and comfort.

After leaving the hospital the patient was observed from time to time and continued to gain in weight and strength. On March 21, 1929 (three months after admission to the hospital), it will be noticed from the chart that his count was remaining quite normal. His weight at that time was 75.5 pounds, a gain of 20 pounds since admission. The parents stated that now for the first time in his whole life was he able to cope with other boys of his own age.

Of further interest was the fact that another opportunity was afforded us to determine the patient's gastric acidity. At this time aspirations were made at five minute intervals following the injection of one-third mgm. of histamin, with the result that free hydrochloric acid was found to be present at the end of each period. The free acid values were low, however, specifically, six, five and q.n.s. (but faintly present on qualitative test).

Conclusion and Comments.—The case reported is considered to be a true pernicious anemia occurring in a boy eleven years of age in which the usual clinical feature indicative of pernicious anemia (with the exception of absolute achlorhydria) was further corroborated by the presence of unusually well-marked characteristics of the so-called "pernicious anemia neutrophil" and by the typical hematopoietic response, as well as the general constitutional reaction, to liver therapy.

One may well ask the question whether we as yet know that we have a fixed syndrome to which we may continue to give the name "pernicious anemia," and exclude from it border-line conditions which closely approximate its major findings. Quite likely the whole story has not yet unfolded itself despite the widespread interest stimulated by the results of liver therapy. The observations on this boy were carefully made and it is hoped that similar studies in young anemics may throw more light, not only on the hematology involved, but on the genesis of the all-important achylia—so striking an accompaniment in adult cases.

RADIOACTIVE WATERS AND SOLUTIONS

Not many years have passed since the Council on Pharmacy and Chemistry, basing its decision on the then available evidence, admitted to New and Non-official Remedies various preparations containing in solution radium or radium emanation (radon), and various devices for causing radium emanation to pass into drinking water. The evidence was not extremely well controlled or profuse in amount, but there seemed to be a demand by physicians for such preparations and the Council considered it worth while to set up at least minimum standards of radium content or radium activity. Actually, innumerable preparations were on the market which contained insufficient radium to have any demonstrable effects. Now the Council has issued the following statement: From an examination of the available evidence, it appears that the value of the internal use of radium solutions or of water containing radon in chronic arthritis, gout, neuritis and high blood pressure is not demonstrated by controlled clinical evidence; that, in spite of many years of trial, acceptable evidence has not become available and until such evidence does become available the Council has decided not to accept generators for the production of water charged with radon or radium solutions intended for intravenous use. The announcement by the Council disposes of the claims made for all sorts of solutions and for the devices to be used in preparation of such solutions, whether they contain considerable amounts of radium or but insignificant traces. (Jour. A. M. A., September 7, 1929, p. 771.)

LIVER EXTRACT NO. 343

The Council publishes a report of the Committee on Pernicious Anemia of the Harvard Medical School. This report states that in May, 1927, the Committee on Pernicious Anemia of the Harvard Medical School was organized to study the properties and to determine the clinical value of the fractions of liver that were being extracted, and to determine in what way a satisfactory product could be made available. Under direction of this Committee, Eli Lilly & Co. offered to manufacture one of the extracts developed. The function of the Committee was merely to supervise the production of a suitable extract of known potency until such time as the medical profession should have become accustomed to its use. The treatment of more than 100 cases of pernicious anemia with this extract indicated that a satisfactory product was available and it was accepted by the Council on Pharmacy and Chemistry for New and Non-official Remedies, under the name "Liver Extract No. 343." For the past year Eli Lilly & Co. has regularly produced lots of material every one of which has been shown to be clinically effective in the treatment of pernicious anemia, by a standardized process approved by the committee. The committee now feels that its function of developing a reliable commercial product has been accomplished, and that it may therefore cease actively to supervise the manufacturing process. (Jour. A. M. A., October 12, 1929, p. 1144.)

President's Letter

VALE

As the year 1929 enters upon its closing month your president feels he must needs give expression of appreciation for the whole-heartedness of the counsel, the support given him by the officers and the various committees, and of the good will as well as the many kindly expressions bestowed by the membership of the State Society.

No one can have any doubt of the future progress of the Minnesota State Medical Association. The year has been one of accomplishment but much remains to be done if we are to maintain our logical position as leaders and educators of public opinion in matters pertaining to the health and welfare of this commonwealth. The affairs of the Association are in good and competent hands, men whose minds are attuned to future progress and whose sense of duty is in accord with the spirit of the times. To them we commit the furtherance of projects under way and others as they may arise, knowing full well that they will "carry on." To all of you our grateful thanks are extended, coupled with the hope that each of you may continue to enjoy that prosperity your efforts so richly deserve and that you and yours may experience a joyous Christmastide and a glad New Year.

J. T. Christison

President,
Minnesota State Medical Association.

EDITORIAL

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Vol. XII December, 1929 No. 12

THE COST OF MEDICAL CARE

Previous mention has been made editorially* of the investigation being made by the Committee on the Cost of Medical Care. This representative committee headed by Dr. Ray Lyman Wilbur, for a number of years president of the Leland Stanford Jr. University and now Secretary of the Interior, has obtained the services of several statisticians, sociologists and economists, in addition to utilizing statistics already gathered by numerous public health agencies, insurance companies and the like, in order to obtain accurate information bearing on the many phases of the subject being investigated.

The undertaking is to take five years. Now after some two years of investigation abstracts of the first three publications are available. As the general subject of medical economics is of such lively interest to the profession it is our purpose to give editorial mention to these publications from time to time.

The purpose and scope of the investigation form the subject of the first abstract published. This was covered in our previous editorial.

The second abstract deals with the extent of illness prevailing in the United States. The figures—some accurate and some admittedly estimates—are doubtless as reliable as it is possible to obtain. Many of us have known in a general way much of the material presented but it seems worth while to report some of the figures gathered by the committee.

We are informed that on the average men are disabled by illness once a year for a period of seven or eight days; women once to twice a year for eight to twelve days; and children more than twice during the school year.

Respiratory diseases such as colds and grippe are far ahead of other groups of disabling diseases. Digestive disorders, throat infections, non-venereal diseases of the genito-urinary tract, dysmenorrhea and skin troubles all are important from a disablement standpoint.

Chronic diseases which are particularly burdensome from a financial standpoint were headed, according to a survey made in Boston in 1927, by heart disease, organic nervous and mental diseases, cancer and arthritis. Over 10 per cent of these cases had lasted ten years or longer at the time of the survey.

The prevalence of disease in the country which is distinctly preventable is appalling. Venereal diseases account for one person in every one hundred being under the care of a physician at any one time. Approximately

*The Five Year Program of the Committee on the Cost of Medical Care. MINNESOTA MEDICINE, August, 1928, XI, 553.

700,000 persons in the country are afflicted with tuberculosis at all times. A million cases of malaria exist each year. Thirty-six thousand cases of smallpox were reported in a recent year. It is estimated there are 110,000 narcotic drug addicts. The complications incident to the two million births in the country each year, which are higher in percentage than in most civilized countries, are preventable in a large degree. The hospitalized mental cases number 350,000. This number equals the total number of available hospital beds for all other conditions and does not include the total number of mental defectives in the country, which is estimated at 900,000 (feeble-minded, imbeciles and idiots).

Preventive measures should be able to cut down this array to a large extent. The stupendous number of mental cases, a large portion of them hereditary, constitutes a eugenic problem which organized society has almost entirely ignored and eventually will have to face.

The medical facilities in this country is the subject of the third abstract published. It is estimated that there are some 1,500,000 persons employed in connection with the care and prevention of illness. There are more physicians in this country for the population than in any other country in the world. The number per 100,000 population varies from 71 in South Carolina and Montana to 200 in California.

Of the 143,000 practicing physicians, 19,000 limit their practice to a special field, 20,000 practice a specialty but do not limit themselves to it. Those on a full time salary basis number about 11 per cent of the total. Dentists number 67,000; registered nurses, 200,000; practical nurses, 152,000; midwives (chiefly in the southeastern states) 55,000; irregular practitioners (osteopaths, chiropractors, Christian Scientists, etc.), 32,000.

A consideration of the hospital situation reveals that the number of available beds has doubled in the past twenty years. Still, about 40 per cent of the counties in the United States have no hospitals for general community use. Considerably more than half of the entire hospital bed capacity is provided by federal, state and local governments. More than one quarter of the beds are provided by non-profit organizations for public service, controlled by independent boards of trustees, churches and other bodies.

The share that hospitals take in the cost of medical care has received the focus of public attention recently. Generalities on the subject are dangerous. With a doubling of available hospital beds it would not be surprising if certain localities found themselves overhospitalized and the undesirable necessity of competition between hospitals arose. We venture to predict, however, that investigations which we understand are being carried out will show that the public gets more from their expenditures for hospital service than they get from hotels, for instance, which of course is as it should be, since most hospitals are tax-free, have received donations to a greater or less degree, and are not operated for profit.

We all have our own ideas regarding the cost of medical care. When we consider the increase in the nation's expenditure in recent years for such out-and-out luxuries as cosmetics, tobacco and alcohol and such debatable necessities as automobile and radio, it is evident that the wherewithal is not lacking but the problem is primarily one of distribution of expenditures with some regard to relative importance of things. This will doubtless never be completely accomplished in a country where the income of prize fighters and movie actors is measured in the hundred thousands, absolutely out of proportion to the character of services rendered.

Education of the public should accomplish something and if the Committee on the Cost of Medical Care after its study has no specific recommendations to offer for reducing the actual cost of medical care but merely demonstrates that the various medical commodities are not relatively too expensive, the investigation will have been worth while.

INTRAVENOUS ANESTHESIA

To observe the development within a few minutes of deep sleep on the administration of intravenous medication is striking to say the least. The use of sodium iso-amyl ethyl barbituric acid, otherwise known as amytal, promises to be an addition in the field of anesthesia. How fully it will replace the inhalation anesthesia, however, is questionable.

The replacement of cholorform by ether was a distinct advance in the field of general anesthesia from the standpoint of safety. Ethylene gas has

distinct advantages over ether in certain cases. Intraspinal anesthesia has had a distinct revival in recent years although its field is necessarily limited. There will always be a large field for local anesthesia. In spite of the boon that anesthetics of all kinds have been to the human species, the last word on the subject of anesthesia has not been said and efforts to improve present methods will continue.

The barbituric acid derivatives of late have come into widespread use as hypnotics. The hypnotic action of amytal given intravenously is its outstanding feature. This action may be augmented by the previous administration of morphine or chloretone or both. In many instances, however, this hypnotic action is not sufficient to permit major surgical procedures without the assistance of slight amounts of other anesthetics.

In many operative cases, however, there is a distinct advantage in being able to put the patient to sleep either in bed or in the operating room preceding the administration of other anesthetics. The psychic effect of the surroundings preceding an operation are not to be ignored. The prolonged quieting effect which persists as long as a day or two following the giving of amytal intravenously has advantages but it also has distinct disadvantages. Too much quiet following operation increases the likelihood of postoperative pneumonia or massive lung collapse. Doubtless, this tendency could be overcome by carbon dioxide and oxygen inhalations. Then, too, experience has shown that postoperatively these patients require constant watching because of an excitation stage which sometimes appears as the effect of the drug diminishes.

The intravenous administration of a drug to produce general anesthesia is necessarily fraught with increased danger. In case of excessive action due to overdose or idiosyncrasy the anesthesia cannot be interrupted as with the inhalation method. The rectal administration of amytal which has been used with some success would permit at least the removal of the drug from the rectum if evidence of overaction arose. On the other hand rectal medication of any sort is uncertain.

It seems premature even for those who have had most experience with amytal administration intravenously to predict the place this anesthesia will ultimately take as a general anesthetic. That it will have its special field seems likely.

A PHYSICIANS' SERVICE BUREAU

Not so many years ago it was not unusual for the general practitioner to send out his statements only once or twice a year. If his fees were paid—all right; if not—all right. Those which were not paid were crossed off the books and considered bad debts. Such were in effect charity cases. The medical profession rightly earned the reputation of being poor business men.

Times have changed. It is now usual for the physician to send out his statements the first of each month. The adoption of modern business methods by the profession has been accepted. In the larger communities hospitals and clinics are maintained for those unable to pay. Here the physician donates his services in the great majority of instances without financial compensation. In addition to this free service most physicians have a certain number of charity patients to whom for one reason or another they give their service gratis.

With the organization of charity medical service, however, the physician must count on his private practice to furnish the wherewithal to keep the wheels going. It seems oftentimes that doctors' bills are among the last to be paid. The family budget, if there is one, provides for current expenses and purchases on the instalment plan but as a rule no provision is made for such emergencies as accident or sickness. Physicians have found it necessary to obtain assistance in collecting unpaid accounts by employing collectors. The methods used by collection agencies as a whole may be perfectly correct but how many physicians know just what methods are used in bringing pressure to bear on their poor accounts?

In addition to bad accounts the physician has a variety of financial interests which can be handled better by group action than by individuals. The physicians' telephone exchange has come apparently to stay. This activity is less likely to be abused when controlled by a representative committee of physicians than by a lay supervisor. The telephone companies have a way of arbitrarily fixing rates for classified directory insertions and extra insertions where group action might prove more effective in preventing unfair rates. A physicians' service bureau can be of material assistance in procuring trained or practical nurses, blood donors, and so forth.

There are just enough deadbeats in every community who go from physician to physician with no intention of ever paying their bills to warrant their classification from a credit standpoint.

These are the activities which have been undertaken by the Physicians' and Dentists' Service Bureau of Saint Paul. Launched July 1, 1928, under the supervision of Mr. H. M. Temple, Jr., the membership has grown from 183 to 250 in a year's time and promises to increase steadily as time goes on. After a year of operation the Bureau has published a confidential guide containing the names of cases which have been referred to the Bureau and ratings in accordance with the manner in which the accounts have been taken care of.

As a confirmation of the idea that physicians should have supervision of the collection of poor accounts, the Bureau has unearthed several instances where it has been discovered that certain accounts had been paid previously to employed collectors but the individual's name had been returned to the physician as an uncollectable account.

A further activity recently added to the Bureau is the handling of instalment payments to physicians. While a large percentage of physicians' accounts are paid in instalments—in many cases very irregularly—it is felt that the slight increase in cost to the physician incident to handling by the Bureau will be more than compensated by more regular payments when made directly to the Bureau. No attempt is being made so far to actually make any cash loans to patients and immediate cash payments to physicians according to the method recently proposed in Chicago which attracted considerable publicity.

Physicians in Saint Paul are not the first to form such a bureau. In many smaller communities physicians have been in the habit of allying themselves with merchants and other professions for mutual protection. Some nineteen cities already have established physicians' bureaus, which list includes the cities of Atlanta, Louisville, Richmond and Jackson (Mississippi). The Saint Paul bureau is already reciprocating with similar bureaus in Memphis, Portland (Oregon), Mineola (New York), and Lexington (Kentucky). The idea is a good one and indications are that new bureaus will be established in the larger centers of population all over the country.

HISTORICAL COMMITTEE

In these days of laboratory and machine-made diagnosis and treatment it is difficult to realize how the generations preceding us practised medicine. Diagnosis and treatment was an art then. Reading the old works shows much keen clinical observation that is often lacking nowadays. Who knows who brought the first stethoscope to Minnesota? We know one was brought here in 1859. Who can substantiate an earlier date? The clinical thermometer was used in St. Paul for the first time about 1870, and we know who introduced it. Do you realize that the hypodermic syringe was not used in the United States till 1856, and that the use of the clinical thermometer and microscope is not mentioned in the Harvard Medical College Catalogue till 1867-1868. A Minnesota physician in a case report published in 1856 states that microscopic examination of a tumor of the stomach showed cancer cells. Can you inform your Historical Committee regarding the use of these instruments in the early days in Minnesota? If so, communicate with Dr. H. M. Workman at Tracy.

J. M. A.

THE ANTIPELLAGRIC VITAMIN

Evidence has been furnished that the so-called accessory food factor formerly designated as vitamin B and supplied in comparative abundance by yeast apparently contains, in addition to the antineuritic vitamin, a factor which promotes growth and cures and prevents dermatitis in rats; consequently it has been regarded as identical with the "P-P" factor described by Goldberger and others as curative and preventive of human pellagra. The newest American designation of this is vitamin G—the vitamin B_2 of British biochemists. There is little doubt that both of these water-soluble vitamins are essential to growth and well-being; and it seems reasonably certain that pellagra is due to a vitamin deficiency. It is now known that unheated yeast is rich in both and that cereals contain more vitamin B than vitamin G; milk and meat, the reverse. The vitamin G value of wheat and maize is low, as is that of dried legumes such as peas. Meat and egg yolk are richer in vitamin G than are the cereals, while liver and fresh milk are excellent sources of this dietary adjuvant. (Jour. A. M. A., October 12, 1929, p. 1149.)

OBITUARY

Louis A. Nippert

1860-1929

Dr. Louis A Nippert, one of the most widely known internists of Minneapolis, was fatally injured when he fell from his horse as it jumped from the path of an oncoming automobile, the evening of November 6, 1929. Dr. Nippert had a wide acquaintance in Minneapolis, having practised there for forty years, and was known and admired by the many graduates of the University medical school through his medical clinics given over a long period of years.

Dr. Nippert was born in Basle, Switzerland, July 14, 1860, of American parents. His father, the Reverend Louis Nippert, was in charge of Methodist missions in Switzerland. Dr. Nippert came to the United States when seventeen years old and lived for some years in Cincinnati, where he graduated from the Miami Medical College of Cincinnati University in 1883. He then spent two years studying in Paris and Vienna before beginning practice in Minneapolis.

For many years Dr. Nippert was on the faculty of the medical school at the University of Minnesota. He had been on the staff of Hillcrest Hospital since its organization. In 1898 he was president of the Hennepin County Medical Society, and in 1912, president of the Minnesota Academy of Medicine. He was a member of the Nu Sigma Nu medical fraternity and also of the Minneapolis Club.

Dr. Nippert is survived by his wife; a daughter, Mrs. Edgar Zelle, of Minneapolis; four brothers, Dr. Henry T. Nippert of Saint Paul, Dr. Edgar Nippert of Los Angeles, Judge Alfred Nippert and Herman Nippert of Cincinnati; and three sisters, Mrs. Helminge of Seattle and the Misses Marion and Eleanor Nippert of Cincinnati.

While Dr. Nippert has not been in general good health for several years, his sudden death came as a shock to his many friends. His upright character and his scientific attainments endeared him to all who knew him.

William J. Byrnes

1859-1929

Dr. William J. Byrnes, a prominent northwest physician and surgeon and former Hennepin county coroner, died suddenly Monday morning, Nov. 4, 1929, at his home, following a heart attack. He was 70 years old.

Dr. Byrnes was active until the time of his death and for many years maintained offices in the Masonic Temple building.

He was born in Minneapolis and received his early education in the schools of that city. As a youth he attended St. John's university at Collegeville, Minn. Later he attended the University of Michigan Medical school, and following his graduation in 1882 he went abroad to study. After practicing in Minneapolis for several years he was named coroner.

In 1889 Dr. Byrnes was elected president of the Hennepin County Medical Society, serving a one-year term. In 1927 he was elected an honorary member of the society.

During the World War, despite the fact that he was too old for active service, Dr. Byrnes carried on volunteer medical work among service men in his home city. He was active in work of the Civic and Commerce Association and was also a member of the Elks and Royal Arcanum lodges.

Surviving Dr. Byrnes are his wife; a son, Dr. W. A. Byrnes of San Diego; three daughters, Lyle Brynes, Mrs. Hallam Huffman of Chicago, and Mrs. Robert J. Seiberlich of Minneapolis.

Mary Whetstone

1849-1929

Dr. Mary Whetstone, 80 years old, the second woman to practice medicine in Minneapolis, and a resident of the city for 40 years, died Thursday, Oct. 24, 1929, at the Minnesota Soldiers' home.

Dr. Whetstone was a graduate of the University of Michigan, having received her medical degree from that institution in 1882. She attended clinics in Detroit, Boston, New York, London, Paris and Vienna. In 1882 she married Dr. Allan S. Whetstone.

She was instrumental in establishing Northwestern Hospital of Minneapolis and in securing its present site. Dr. Whetstone was the first woman to be elected vice president of the State Medical Association, and the first woman physician appointed on the staff of Asbury and City hospitals.

Besides being prominent in medical circles, Dr. Whetstone was active in various women's organizations, having served as superintendent of medical temperance for the W. C. T. U. and as a promoter of the Minneapolis Mycological Society. She is credited with being responsible for introducing the teaching of cooking in the public schools in Minneapolis.

She was an active worker for woman suffrage.

Surviving are two sisters, Mrs. Margaret Wimer of St. Louis, Mo., and Mrs. Sumner Lord of Marshalltown, Iowa.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

These views on state medicine from the *Chicago Journal of Commerce* and the *Illinois Medical Journal* will be of interest:

"President Frank of the University of Wisconsin has declared in a speech before the American College of Surgeons that unless medical practitioners "excel the industries, insurance companies, and governments in their zeal for the promotion of preventive medicine," the present individualistic medical profession is certain to be "superseded by state medicine or its equivalent." This is a loose use of words, since the possible equivalent which he foresees is not really an equivalent; it is "a vast high-powered medical machine, under the sponsorship of industries, insurance companies and governments." A private medical system supervised by governmental agencies is not the equivalent of a governmental system. It means bureaucracy, not socialism. But either of these alternatives would destroy the individualistic medical profession.

"It has been evident for some time that the profession cannot survive in its present form. It does no good for the doctors to attribute the high cost of sickness to hospital and laboratory charges, and to the demands of patients for private rooms and private nurses, whether they need them or not. The plain fact is that the doctors get little sympathy from the public.

"The public is sympathetic to a revolution in the economics of medicine. Unless the profession itself evolves methods for reducing the cost of sickness, corporation medicine will probably become dominant within the next generation."—*The Chicago Journal of Commerce.*

"State operation and state control of medicine ruined medical practice in Germany and has given the people of that country the worst medical service administered in any civilized country in the world.

"When an institution such as a university or a corporation enters into the practice of medicine, as is the case in many instances at the present time, there come up certain points of interest to the medical profession.

"A university is endowed for education, research and scholarship, and when it enters the practice of medicine it is dealing unfairly with the private practitioner. 'Unfair,' because this institution has the enormous advantage of reputation and size to attract patients. 'Unfair,' because even if it charges large fees its prestige would make it an impossible competitor with the private practitioner.

"Much is being said by economists about only the very wealthy and the very poor getting the maximum of medical service, and so leaving the great middle class unable to procure the so-called maximum service. This statement is not accepted by thinking medical men. We believe that the private practitioner is giving good service and sees that his patients get what they need at a price they can afford to pay.

"There is a strong tendency at the present time to systematize or machine out the most desirable thing in the practice of medicine, and that is, the very personal contact of physician and patient. This personal contact cannot be removed without jeopardizing the best interest of the physician, the patient and the public. Chain store or department store medicine is detrimental to the welfare of both the physician and the public.

"It is important under the present standard of ethical procedure that groups practising medicine must adhere to the same ethical principles as regulate individuals. Because of their size and influence corporations are in no way relieved of the ethical responsibility that applies to general practitioners. If the staff of corporations engaged in the practice of medicine fails to recognize this fundamental principle then all the men connected with the staff should be amenable to the same discipline as if they were individual practitioners."—*Illinois Medical Journal.*

OF GENERAL INTEREST

Dr. O. E. Locken was re-elected mayor of Crookston at the biennial municipal election held in November.

Dr. and Mrs. Adam M. Smith have returned from Europe, where Dr. Smith was doing post-graduate work in Vienna. He will limit his practice to internal medicine.

Dr. W. K. Foster, for a number of years instructor of gymnastics at the University of Minnesota, has resigned his position to enter private medical practice in Minneapolis.

Dr. W. Andrew Bunten of Rochester has announced the opening of offices at Suite 654 Fisher Building, Detroit, Michigan, practice limited to neurosurgery and neurosurgical diagnosis.

On October 12 Dr. Raymond Sorenson severed his connections with Dr. W. R. Humphrey at Stillwater, Minnesota, to accept a position with the U. S. Government Hospital at the National Soldiers' Home, Danville, Illinois.

The marriage of Miss Dorothy Dean and Dr. Louis Good took place Thursday, October 31, in Saint Paul. Dr. Good will enter the practice of surgery in Texarkana, Texas, with offices in the Texarkana National Bank Building.

The Mississippi Valley Dermatological Conference was held at the University Hospital on Friday, October 25, and at the Mayo Clinic on Saturday, October 26. There were fifty-three visitors from Chicago, Cincinnati, Milwaukee and St. Louis.

The marriage of Miss Margaret Wirt Ritchie of Little Falls, Minnesota, to Dr. Asher Abbott White, son of Dr. and Mrs. S. Marx White of Minneapolis, will take place early this month, according to a recent announcement of the engagement.

Dr. C. H. Sherman of Bayport, Minnesota, is attending the Graduate School of the University of Pennsylvania, where he is working for a Master's degree in surgery. Dr. E. V. Strand, a recent graduate of the University of Minnesota, has taken over Dr. Sherman's practice at Bayport.

Dr. Howard McI. Morton of Minneapolis has returned from Holland, where he lectured before the International Ophthalmological Congress. Dr. Morton will make an intensive study of causes and treatments of blindness, as a member of an international committee on the prevention of blindness.

A report from the recent meeting of the American College of Surgeons gives a list of sixteen approved hospitals in Minneapolis, twelve in Saint Paul, with a considerable list scattered throughout other towns in the state of Minnesota. Dr. Malcolm T. McEachern, associate director of the college, stated at the meeting that the mortality rate in hospitals, now averaging 3.5 per cent, has been cut in half in the last decade. Twenty-three Minnesota surgeons were elected to fellowships at the meeting.

COMMUNICATIONS

Dr. E. A. Meyerding, Secretary,
Minnesota State Medical Association.
Dear Doctor:

I am in receipt of the Certificate of Honorary Membership in the Minnesota State Medical Association.

Owing to vacation time I am tardy in acknowledgment of this favor by my friends and associates in Minnesota, and ask you to convey to them my sincere appreciation of their kindness.

I miss the fellowship of the men I've worked with these years more than I can express.

I am glad to be able to do a limited work here. However, no place will be quite like Minnesota.

My best regards to Minnesota physicians, whom I shall enjoy seeing any time they pass this way.

Very sincerely yours,
C. A. Donaldson, M.D.

To the Editor:

The following members of the Minnesota Medical Association were elected to Affiliate Fellowship in the American Medical Association at the Portland meeting:

Anderson, A. E., Minneapolis.
Bacon, Russell S., Montevideo, Minn.
Bell, John Wesley, Minneapolis.
Boehm, John C., St. Cloud, Minn.
Bole, R. S., St. Paul.
Bracken, H. M., Claremont, Calif.
Brown, E. J., Minneapolis.
Clark, Thomas C., Minneapolis.
Darling, J. B., St. Paul.
Davis, William, St. Paul.
Disen, Charles F., Minneapolis.
DuBois, J. A., Sauk Center, Minn.
Dutton, C. E., Minneapolis.
Haverfield, Addie R., Minneapolis.
Hawkins, V. J., St. Paul.
Hunt, F. N., Fairmont, Minn.
Johnson, H. C., St. Paul.
Johnson, H. P., Fairmont, Minn.
Linton, William B., Minneapolis.
Long, Jesse, Minneapolis.
Lum, C. E., Duluth, Minn.
Magie, William H., Duluth, Minn.
McComb, C. F., Duluth, Minn.
Mead, Marion A., Minneapolis.
Nippert, L. A., Minneapolis.
Richardson, W. J., Fairmont, Minn.
Schoch, J. L., New Ulm, Minn.
Simpson, J. D., Minneapolis.
Soderlind, A., Minneapolis.
Whitney, A. W., St. Paul.

Sincerely yours,
E. A. Meyerding, M.D.,
Secretary, Minnesota State Medical Association.

CONSULTATION BUREAU

Wm. A. O'Brien, M.D., *Director*
Minnesota State Medical Association
11 West Summit Avenue
Saint Paul, Minnesota

1. *Question.*—Patient came in complaining of vague abdominal pain. X-rays revealed no disease in the stomach, but mild chronic gall-bladder disease was present. Patient was put on routine medical treatment for one month with no relief. Cholecystectomy and appendectomy performed. Gall-bladder was apparently normal, slightly thickened wall, no discoloration, or increase in subserous fat layer; no stones found. Appendix showed adhesions, otherwise no change. Patient had normal recovery. Wound drained for two and a half weeks, last four days mostly serosanguineous fluid. Three weeks after operation, patient began to show jaundice. This started in region of incision, spreading upwards over arms and face, then down to lower extremities in next few days. Stools became clay-colored, urine dark, and skin itched. Jaundice became more marked in following weeks, until now, eight weeks postoperative, patient is 4 plus jaundiced. This jaundice is more marked in the morning than in the evening, after patient has been up and around. Since advent of jaundice, patient has been on fat-free, high-protein, low-carbohydrate diet, enteric coated magnesium sulphate pills, forced fluids, rest in bed, free catharsis and digitalis, minims 15 t.i.d.

Patient is well developed white female, age 57, with 4 plus jaundice all over body. Eyes normal. Sclera 4 plus jaundice. Mouth—no teeth. Tongue smooth at edges, normal size. Neck negative. Chest negative. Heart enlarged moderately to left, otherwise negative. Pulse rate 110, regular and full. Abdomen—no ascites present, tenderness in region of incision in right upper quadrant. Pelvic examination negative. Rectal examination—few internal hemorrhoids present, not large or bleeding. Extremities—slight swelling of ankles, no edema. Reflexes—nervous system negative throughout. No adenopathy.

Repeated urinalyses show bilirubin present, no albumin or sugar, 5-10 wbc, few hyalin casts per high power field (centrifugal specimen). Repeated blood studies show hemoglobin 80-86 per cent, red blood cells 4,000,000-4,600,000, white blood cells 6-8,000; differential count—polymorphonuclears 65, lymphocytes 28, eosinophils 2, mononuclears 5 (the highest reading on last test taken a week ago). No abnormal red or white cells.

The questions which arise are: What is the exact cause of the jaundice and how long is it advisable to wait before entering the abdomen again for exploration?

Answer.—The diagnostic possibilities are carcinoma of the head of the pancreas, cirrhosis of the liver, carcinoma of the biliary tract, stone in the common duct, and acute hepatitis of the liver. Liver abscess should be mentioned although the jaundice is usually not as severe as you have described. I would have mentioned acute catarrhal jaundice except for the fact that it has existed for such a long time.

We know of a similar experience in a patient. When first seen, the symptoms suggested acute catarrhal jaundice, but as time went on and the condition did not clear up, she was explored. The main complaint of the patient was toxic adenoma and the jaundice was only incidental. At operation, cirrhosis of the liver was found after jaundice of eight weeks duration.

There is only one concrete suggestion that we can offer. The patient should be explored as soon as possible. If the obstruction is malignant, an anastomosis between the duodenum and gall-bladder can not be made. If it is due to cirrhosis of the liver and the spleen is enlarged, a splenectomy is indicated. If a stone is present in the common duct, it can be removed; and if the condition is due to cholangeitis, the tract can be drained. I think you have waited a sufficient length of time before advising exploration. It is possible that the slight trouble in the gall-bladder may not have been responsible for the initial symptom.

2. *Question.*—In March, 1929, I operated on a woman, 50 years old, for a ruptured appendix and peritonitis. Six days later, it was necessary to put a tube in the bowel, which I did on the left side about the level of the umbilicus. She recovered and is in good health, but the fistula where I put the tube in the bowel failed to close. Her bowels move normally and the skin is in good condition. It drains about one or two teaspoons a day. Should I operate now to close it or wait longer? What operation is best? Please tell me what things to avoid.

Answer.—There is no great hurry in closing the fistula as long as the patient is not showing any signs of loss or irritation of the skin from the intestinal fluid. The second reason for delay is that these operations are often difficult and nature should be given a chance to help you.

Is the patient really suffering from an opening in the bowel? This may be determined by injecting barium or lipiodol into the sinus tract and taking *x*-ray pictures.

An attempt should be made to close the opening from the outside. If a piece of rubber tubing is pushed down the wound, it is sometimes possible to pull the base up against the opening. A rubber tube, 2 or 3 inches in length, is tied in the middle with a string. The tube is doubled back with the tied portion at the apex. This is pushed into the sinus tract, if the tract is large enough, and pulled tight against the opening if the tube has straightened out in the lumen of the bowel. A button may be placed over the opening and the tube tied with this. If healing occurs, all that is necessary to do is to cut the string and allow the tube to pass through.

If these methods fail, an operation may be indicated. The procedure may vary from a simple closure of the intestinal mucosa with inversion of the mucous membrane to a resection of the bowel with anastomosis. It is best not to try surgical treatment until other methods fail, and then be sure that you anticipate any difficulties that may arise.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

AMERICAN COLLEGE OF PHYSICIANS, FOURTEENTH ANNUAL CLINICAL SESSION, MINNEAPOLIS, February 10-14, 1930

The American College of Physicians will hold its Fourteenth Annual Clinical Session in Minneapolis, February 10-14. Dr. John H. Musser, Professor of Medicine at the Tulane University School of Medicine, is President of the College this year. Dr. Sydney R. Miller, Associate Professor of Medicine at the University of Maryland School of Medicine, Baltimore, is President-Elect, and will be inducted to the Presidency toward the end of the Minneapolis Session. Dr. S. Marx White, Professor of Medicine at the University of Minnesota Medical School, is General Chairman of all Minneapolis Committees having charge of arrangements for the Clinical Session for the College in Minneapolis.

The Program provides hospital visits, clinics, demonstrations and ward-walks during the forenoons at various Minneapolis Hospitals; formal addresses for the general scientific sessions each afternoon and evening; a large medical exhibit and other features. All of the general assemblies, afternoons and evenings, will be held in the Minneapolis Auditorium. Eminent authorities in their special lines will present the results of their work before an audience competent to appreciate the value of the contributions.

The Convocation for the conferring of Fellowships will take place Wednesday evening, and will be followed by a reception and a program of general entertainment. Dr. John H. Musser, President, will deliver the chief address at the Convocation. The annual Banquet of the College will be held Thursday evening, February 13, at the Hotel Curtis.

Programs, details concerning reduced fares, admission of non-members, etc., may be secured from the Executive Secretary, E. R. Loveland, 133-135 S. 36th Street, Philadelphia, Pa.

MINNESOTA TRUDEAU MEDICAL SOCIETY

The annual meeting of the Minnesota Trudeau Medical Society was held at the Duluth Hotel, Duluth, Minnesota, at 6:30 P. M., October 19, 1929. There were twenty-eight members present.

The first business of the meeting consisted in a report from the various committees. Dr. Beadie of the Membership Committee submitted the following names for consideration of membership:

Dr. W. A. Colton, Veterans' Hospital, St. Paul.

Dr. L. H. Flancher, Sand Beach Sanatorium, Lake Park.

Dr. L. S. Jordan, Riverside Sanatorium, Granite Falls.

These members are to be acted upon at the next meeting.

Dr. D. G. Gardiner of Ancker Hospital, St. Paul, whose name was presented at the previous meeting, was elected to membership.

The remaining committees had no reports to make.

This being the annual meeting of the Society, a Nominating Committee was elected. On motion duly seconded, the following names were nominated and then unanimously elected for this committee:

Dr. F. L. Jennings, Glen Lake Sanatorium, Oak Terrace.

Dr. H. A. Burns, Minnesota State Sanatorium, Ah-Gwah-Ching.

Dr. S. A. Slater, Southwestern Minnesota Sanatorium, Worthington.

The following program was presented: "Experimental Tuberculosis by Intracerebral Inoculation" by Dr. Wm. H. Feldman of the Mayo Clinic, Rochester. Discussion followed by Drs. Laird, Hirschboeck and Lemon. "Forensic Medicine—Its Relation to Tuberculosis" by Mr. O. G. Haugland, attorney, secretary to the State Board of Law Examiners. Discussion by Drs. Tuohy and Harrington.

On motion duly seconded, the meeting adjourned.

ARNOLD S. ANDERSON, M.D.,
Secretary-Treasurer.

RICE COUNTY MEDICAL SOCIETY

A meeting of the Rice County Medical Society was held Friday, November 1, in the Stewart Hotel, Northfield, where a dinner was served under the auspices of Dr. P. A. Smith, of Faribault.

Dr. E. M. Hammes of St. Paul gave an interesting message on "Neurological Cases in General, with Special Reference to the Difficulties in Diagnosis."

Election of officers for 1930 resulted as follows:

President.....Dr. J. M. Murdoch, Faribault
First Vice President....Dr. Warren J. Wilson, Northfield
Second Vice President.....Dr. Edmund Backe, Kenyon
Secretary-Treasurer.....Dr. C. J. Plonske, Faribault
Delegate.....Dr. A. M. Hanson, Faribault
Censors—Dr. C. A. Traeger, Dr. W. H. Aumpf, Faribault; Dr. F. M. Babcock, Northfield.
Publicity Committee—Dr. W. H. Robilliard, Dr. S. B. Haessly, Faribault; Dr. F. M. Babcock, Northfield.

A vote of appreciation and thanks was extended to Dr. Hammes for his talk, to Dr. P. A. Smith for his hospitality and dinner and to Dr. A. M. Hanson for the use of his lantern machine.

C. J. PLONSKE, M.D.,
Secretary.

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Officers elected at the annual meeting of the Camp Release Medical Society at Montevideo on October 14, 1929, are as follows:

President—Dr. M. A. Burns, Milan
Vice-President—Dr. J. S. Killbride, Canby
Secretary-Treasurer—Dr. L. J. Holmberg, Canby

Following the business meeting short addresses were made by Secretary Meyerding and President Christison of the State Association.

The Woman's Auxiliary held their annual meeting at the same time and elected officers:

President—Mrs. M. A. Passer, Olivia
1st Vice President—Mrs. H. M. Johnson, Dawson
2nd Vice President—Mrs. L. G. Erickson, Wood Lake
Treasurer—Mrs. L. G. Smith, Montevideo
Secretary—Mrs. L. C. Adams, Bird Island

At the evening meeting, following a joint dinner at the Riverside Hotel, Mr. F. Manley Brist, Attorney for the State Board of Medical Examiners, spoke on the work of his office. The address of the evening was a most interesting and illuminating presentation of the subject of anaphylaxis by Dr. Edgar T. Herrmann of St. Paul.

MINNESOTA ORTHOPEDIC CLUB

The semi-annual meeting of the Minnesota Orthopedic Club was held in Minneapolis November 1 and 2, 1929. There were ten members present.

A dinner meeting was held November 1, and clinical meeting at the Shriners Hospital November 2. Informal discussion and clinical material were presented to the members.

George A. Williamson, M.D.,
Secretary.

ST. LOUIS COUNTY MEDICAL SOCIETY

The following officers were elected at the Annual meeting of the St. Louis County Medical Society held October 10, 1929:

President.....Dr. F. J. Elias, Duluth
First Vice President.....Dr. C. W. Bray, Biwabik
Second Vice President.....Dr. O. E. Heimark, Duluth
Secretary-Treasurer.....Dr. M. McC. Fischer, Duluth

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

Cutter Laboratory
Diphtheria Toxoid-Cutter
Eli Lilly & Co.
Merthiolate
Winthrop Chemical Co., Inc.
Luminal Capsules, 1½ grains

TRUTH ABOUT MEDICINES

Calcium Gluconate-Sandoz.—It contains calcium equivalent to not less than 12.40 or more than 12.80 per cent of calcium oxide. Calcium Gluconate-Sandoz is used to obtain the therapeutic effects of calcium. It is more palatable than calcium chloride and for hypodermic or intramuscular use is non-irritant. It is supplied in the form of a powder and in ampules containing 10 c.c. of a ten per cent stabilized supersaturated solution. Sandoz Chemical Works, Inc., New York.

Acne Bacillus Vaccine.—An acne bacillus vaccine (New and Non-official Remedies, 1929, p. 369) marketed in packages of one 5 c.c. vial, and in packages of one c.c. vial. Hollister-Stier Laboratories, Spokane, Wash.

Pertussis Bacillus Vaccine.—A pertussis bacillus vaccine (New and Non-official Remedies, 1929, p. 371) composed of several strains of pertussis bacilli, marketed in packages of one 5 c.c. vial, and in packages of one 20 c.c. vial. Hollister-Stier Laboratories, Spokane, Wash.

Staphylococcus Vaccine (Aureus and Albus).—A staphylococcus vaccine (New and Non-official Remedies, 1929, p. 375) prepared from *staphylococcus aureus* and *albus* in equal proportions, and marketed in packages of one 5 c.c. vial and in packages of one 20 c.c. ampule. Hollister-Stier Laboratories, Spokane, Wash.

Typhoid-Paratyphoid Vaccine (Prophylactic).—A typhoid vaccine (New and Non-official Remedies, 1929, p. 378) consisting of a suspension of killed typhoid, paratyphoid A, and paratyphoid B bacilli. It is marketed in packages of one 5 c.c. vial and in packages of one 20 c.c. vial. Hollister-Stier Laboratories, Spokane, Wash. (Jour. A. M. A., October 5, 1929, p. 1065.)

Atoquinol-Ciba.—The allyl ester of 2-phenyl-quinolin-4-carboxylic acid. The actions and uses of Atoquinol-Ciba are practically like those of cinchophen. It is supplied in the form of tablets, 0.25 Gm. (4 grains). Ciba Co., Inc., New York. (Jour. A. M .A., October 19, 1929, p. 1223.)

Chiniofon. — Sodium-iodoxyquinolinesulphonate.—A mixture prepared from approximately four parts of 7-iodo-8-hydroxy-quinoline-5-sulphonic acid, containing not less than 26.5 per cent of combined iodine, and 1 part of sodium bicarbonate. Chiniofon, which is closely similar to preparations introduced under various proprietary names as wound antiseptics, has been found to be of use in the treatment of amebic dysentery.

Bacillus Acidophilus Culture-Hollister-Stier. — A pure culture of *B. acidophilus* which contains not less than 150 million viable organisms *(B. acidophilus)* per c.c. at the time of issue. For a discussion of the actions, uses and dosage of bacillus acidophilus preparations see Lactic Acid-Producing Organisms and Preparations, New and Nonofficial Remedies, 1929, p. 220. Hollister-Stier Laboratories, Spokane, Wash. (Jour. A. M. A., October 26, 1929, p. 1309.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of October 9, 1929

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, October 9, 1929. Dinner was served at 7 p. m. and the meeting was called to order at 8 p. m. by the President, Dr. C. N. McCloud. There were 40 members and 1 visitor present.

Minutes of the September meeting were read and approved.

The scientific program consisted of the following:

Dr. Emil S. Geist (Minneapolis) reported a case of "Internal Derangement of the Knee," with operation for removal of the foreign body. The patient was presented, and *x*-ray films were shown. He spoke as follows:

On October 3, 1928, I read a paper before the Southern Minnesota Medical Society entitled "Foreign Bodies in and Near Joints." This appeared a few months later in Minnesota Medicine. In this paper I reported twenty-two cases of joint disturbance due to the presence of a foreign body. In one-half of these the presence of this foreign body was unsuspected by the patient. The following case is another added to this list.

This patient, Mr. G. A. G. (Case No. 290200), was referred to us on March 18, 1929, by Dr. Linner of Minneapolis. He gave the following history:

The patient could not remember any injury whatever but said that on February 15, 1929, his left knee locked while he was getting into his automobile. The knee swelled and there was much pain, especially on its outer side. He was on crutches for two weeks, after which time the swelling and pain subsided. On March 14, he had a second "attack" followed by similar symptoms. I saw him four days later.

On examination I found the following: Left knee, absolutely normal in every respect. Motions normal. There is a little tenderness on the outer side of the knee and above the level of the patella. This tenderness is very constant. It embraces an area of about a twenty-five cent piece and apparent tumefaction can be felt in this region, although this is indefinite. No tenderness about the joint fissures. No effusion.

Numerous roentgenograms were taken and the following are the notes I wrote on our record: "*X*-rays taken in this office show a peculiar shadow which is present on all *x*-rays. (Several confirmatory pictures were taken.) It looks as though a small piece of wire were in the knee joint on its outer side and above the level of the patella. This shadow may represent the calcareous rim or edge of a cyst-like structure."

An exploratory arthrotomy was advised.

On March 21, 1929, the following operation was done: "Incision was made on the outer side of the knee joint above the patella. It was four and a half inches long. The knee joint was entered and after considerable search a small piece of very thin wire (corresponding to the *x*-rays) about five-eighths of an inch long was removed. The synovial membrane was sutured with plain catgut, the capsule with chromic catgut, and the skin with dermal. Posterior splint applied."

The piece of wire was embedded immediately below the synovial membrane. It could be barely seen glistening through this membrane, and it was definitely recognized after it was examined in situ by the examining finger.

It was only a few days following the operation that the patient recalled that a few months previous to the onset of symptoms he was polishing a piece of metal. He used an electrically driven circular wire brush and said that while doing this he had the sudden sensation in the knee as though he had been stung by a bee. He noted no blood on his clothes, forgot about it, and in no manner associated the onset of his knee trouble with this incident.

The following conclusions may be drawn:

(a) Any abnormality, as seen on a roentgenogram, however slight it may be, should attract attention. It should be followed by numerous confirmatory pictures until a definite conclusion has been arrived at.

(b) A foreign body, usually metallic in nature, can enter a joint without the patient being aware of it. This is especially the case with needles.

(c) Mr. Lane's injunction to use only instrumental technic in joint surgery is a good one and is followed by us. But there are occasional exceptions. If I had not put my gloved finger into this man's knee joint, I would not have found the offending foreign body.

DISCUSSION

Dr. H. B. Sweetser (Minneapolis): I just want to mention the difficulty of finding these foreign bodies and think Dr. Geist is to be congratulated on finding this so readily. To search for a needle or small metallic body in tissues is one of the most exasperating things. I have taken out small needles in the dark room under the fluoroscope.

Dr. Geist: There is not much to add, except that in obscure joint lesions we will occasionally find a foreign body at the bottom of the trouble.

D. Everett K. Geer (St. Paul) read his thesis entitled "Evulsion of the Phrenic Nerve for Pulmonary Tuberculosis." After the reading of the thesis Dr. Geer showed several lantern slides. (Thesis to appear later in Minnesota Medicine.)

Dr. McCloud (St. Paul): I am sure we all enjoyed very much hearing this excellent thesis of Dr. Geer, and I am going to ask some of those associated with him in the work to discuss it first.

Dr. L. E. Daugherty (St. Paul): Practically all of the phrenicotomies we have done have been preliminary to or following thoracoplasty. We have performed the operation of thoracoplasty on 115 cases. The last 50 have had phrenicotomies. It has seemed to me that the results obtained in the last 50 cases have been better and their symptoms have subsided more promptly than those on whom a phrenicotomy was not done. Considering the large number of anatomical variations in the course of the phrenic nerve, we have been very fortunate. In only two cases were we unable to find

the phrenic nerve. One of these cases had had a previous thoracoplasty and I can easily understand how the anatomy of the phrenic nerve may be disturbed by thoracoplasty. Dr. Sauerbruck has reported a case of fatal hemorrhage following a phrenicotomy. It is probable that the phrenic nerve was so intimately associated with the subclavian vein that when the nerve was evulsed the vein was torn. When we first started this work Dr. Gardiner suggested the use of the battery in order to identify the phrenic nerve. By stimulating the phrenic with the battery and by placing one hand on the upper abdomen, the nerve is easily identified by the sudden contraction of the diaphragm which can be easily felt. I have been particularly impressed not only by the anatomical variation in the location of the phrenic nerve but also by the size of the nerve. In some cases it appears to be the size of the lead of a pencil and in others it is much smaller. Dr. Gardiner, my associate in this work, has performed the operation of phrenicotomy in most of the cases which I report and I would like to hear from him.

Dr. E. M. Jones (St. Paul): I had some experience with a few of the earlier cases of Dr. Geer's series. I think that technically phrenicotomy is not a difficult procedure. The most important thing is the identification of the nerve, and this can be done by using a current to stimulate the nerve or by placing the patient under a fluoroscope and stimulating the nerve by grasping it with forceps. Another very important technical procedure is the slow evulsion of the nerve. After the nerve has been cut, the distal end should be grasped by forceps and with steady traction the nerve is very slowly rolled around the instrument. If there is a great deal of resistance and too much force is used some irreparable damage may be done.

Dr. D. G. Gardiner (St. Paul) (by invitation): I am indebted to Dr. Geer and Dr. Daugherty for seeing and operating these cases, and to this Society for the opportunity of discussing this paper. I think in seeing these slides of Dr. Geer, they more or less speak for themselves. When we tackle the subject of tuberculosis from the surgical standpoint, I think that any procedure that has to do with the collapse of the lung must be considered seriously. In these cases we have three sides of the chest to deal with, i.e., the thoracic, the diaphragmatic and the mediastinal. Any procedure which tackles the diaphragm itself seems to me as efficacious as any procedure which tackles the thoracic cage itself. Dr. Geer spoke about adhesions, which we used to think were contraindications to phrenicotomy. We have done a number of these at Ancker Hospital recently and in some we have found the diaphragm becomes fixed and doesn't move, and that accounts for lung relaxation obtained even without securing an actual rise of the diaphragm.

One point Dr. Geer mentioned in one case of far advanced tuberculosis that died. I was fortunate enough to see the post-mortem of this patient. There were very dense intra-abdominal adhesions which were adherent to the diaphragm on the peritoneal side. So we might well look to the peritoneal condition when the diaphragm does not rise. Dr. Geer also mentioned the fact that the twelfth intercostal innervates the diaphragm. We don't know but that the intercostals may take on a compensatory function. I feel that may be a factor. We have had cases in which we felt we had gotten the entire phrenic nerve without question and sometimes we have seen a late return of function.

Dr. Geer mentioned the fact that Mattson has dissected 112 cadavers. I did not feel very good about that when he told me the day before I took out a nerve that Mattson had found one case in which the nerve transfixed the subclavian vein and two others in which the nerve wound itself around the vein before going into the chest. However, we have not found anything of that sort yet. We have had no fatalities in our cases.

Dr. Jones mentioned the fact that this work is sometimes done under the fluoroscope. Dr. W. Meyer of New York has had to re-operate several cases in attempts to evulse the phrenic nerve. After identifying what he thought was the phrenic nerve he injected it with alcohol and did a fluoroscopy and found almost an immediate fixation of the diaphragm; he then proceeded to evulse the nerve. Undoubtedly fluoroscopy does help in unusual cases.

Dr. Daugherty spoke of finding the phrenic nerve after thoracoplasty. I have operated only one case after thoracoplasty and was agreeably surprised to find that it was the easiest case. Most men have the experience of hunting for the nerve and not finding it. Dr. Daugherty also spoke of some of the anomalies that have occurred and I myself have had one case where the nerve was buried in the substance of the muscle. Recently we found a number of cases in which the transverse colic artery and accompanying veins, lying high, have hidden the nerve and just this morning we had a case in which the phrenic nerve was lying behind this vessel.

In regard to post-operative treatment, there is practically none necessary. We have had no deaths, but we have had two cases which were rather unusual, that of subcutaneous emphysema. In one case (the man has subsequently died of his tuberculosis) we noticed that the next day after the operation he had a rather wide area extending up to the angle of the jaw, down over the chest and into the posterior cervical region. In another case it was much more limited. We were rather puzzled as to how this might occur. Perhaps the mediastinal pleura was torn. However, both of these cleared up. We sometimes see this condition after chest trauma. These two have been the only complicated cases that we have had.

In one case I thought I found the phrenic nerve; I got a pseudo reaction, and evulsed the nerve. The next day we found she had a Horner's syndrome. This evidently was only partial because it has cleared up to some extent since. In one case which I missed, and in which Dr. Daugherty missed, we both felt the nerve was absent entirely, as does occur, or else it was not lying in the normal position.

Dr. H. L. Taylor (St. Paul): These surgical efforts to help us in our care of the consumptive simply show how we are glorifying rest in the treatment of tuber-

culosis. That, of course, is the thing the surgeons showed us long ago in regard to joint and surgical tuberculosis but it is just as true of tuberculosis in the lung. The lung is constantly in motion. It is not confined or attached except at the hilum and it is shaking like a glassful of jelly all the time, the air coming in and going out with the movements of the body. But these surgical inventions have made it possible to collapse the lung or "splint" it and arrest its motion.

In the use of rest even outside of these cases where we do not use surgical intervention, our procedure has changed very considerably. Dr. Gerald Webb, who was recently here from Colorado, asked me if I had changed my procedure much in regard to the rest to which I subjected these patients. I remember when I first opened Pokegama I had a very strict rule that if a patient had a temperature of 100° that patient had to stay in bed for 24 hours after the temperature fell to normal. Now no one enters Pokegama unless he is put to bed for 6 weeks, whether he has fever or not, and he is fortunate if he gets up even when the 6 weeks have passed.

Dr. S. Marx White (Minneapolis): I realize the extraordinary interest which this subject has for the surgeon, but its interest is as great for those who are in charge of the prolonged treatment usually necessary in tuberculosis. Dr. Geer has given us a full, succinct account and valuable addition to our knowledge of this particular provision of rest in the treatment of tuberculosis. It might be interesting for the moment to think of some of the things that have been added to the treatment of tuberculosis by the surgeon. In the first place it was learned how great an aid it was to collapse the lung by means of pneumothorax. Jacobæus next found that, using an endoscope passed through an artificial opening in the chest wall, adhesions could be severed under visual control, and the use of pneumothorax was extended. Later bilateral pneumothorax was shown to be possible. Then with thoracoplasty (either partial or complete), with phrenicotomy, and also with multiple intercostal neurectomy, most of the movements of the hemithorax are brought under control by the surgeon. The physician who is treating the case has thus an adjunct which I think is an important one. Still the patient provides a medical problem under the prolonged care of the physician.

Dr. Geer (in closing): I have nothing to add except to thank the members who have discussed my paper.

Dr. Carl B. Drake (St. Paul) reported the following case of Massive Collapse of the Lung.

This case of massive collapse of the lung seems worth reporting inasmuch as the collapse occurred while the patient was confined to bed in the hospital and was not preceded by injury nor operation.

Mrs. F. E. F., aged 40, was admitted to the Ancker Hospital March 14, 1919, on the gynecological service, complaining of indefinite lower abdominal pain, weakness, and some fever. The pelvis was found to be normal and she was transferred to the medical service.

Aside from a pleurisy at the age of 21, and an appendectomy and cholecystectomy at 38, her history was unimportant. There was no history of exposure to tuberculosis. Her father and mother had lived to be over seventy and her husband and three children are living and well.

Upon examination the patient was found to be undernourished and running a daily fever of one to two degrees and a pulse of 90 to 100. The blood pressure was 112/50. The heart and lungs were normal on physical examination. The urine was normal. During her stay in the hospital the blood on two occasions showed a slight reduction in red cells and 23,000 and 22,000 white cells, with 47 and 36 per cent eosinophiles.

Two weeks after admission the patient complained of severe pain in the heart region aggravated by deep breathing. Two days later, examination showed the following:

The patient was lying comfortably in bed and did not appear to be dyspneic. The heart apex was palpable 8 cm. to the left in the fourth intercostal space and a cardiac impulse was visible and palpable 7.5 cm. to the left in the second interspace. The right heart border was at the midsternal line. Aside from a slight systolic murmur over the pulmonary area, the heart was normal. The left lung area was markedly impaired in resonance except at the base posteriorly, where the resonance seemed normal, while there was almost a flatness to percussion below the left clavivle. In the subclavicular region the vocal fremitus was increased, vocal transmission both to whisper and spoken voice was intensified, the expiratory breath sound was increased and many crepitant râles were heard. No râles were heard at the right lung apex. The spleen was palpable.

The chest *x*-ray showed a marked homogeneous opacity of the entire left lung and the heart definitely pulled to the left. There was also a slight mottling of the right apex and a faint line indicating interlobar pleural thickening in the right lung field.

A diagnosis of massive collapse of the lung was made, but the maneuver of turning the patient onto the right side and having her cough failed to expand the left lung.

Bronchoscopy was performed by Dr. Gardiner on April 12th. No mucous plug was found but the bronchi on the left side appeared somewhat narrower than normal. The *x*-ray taken just before bronchoscopy showed the left side less opaque and an *x*-ray taken ten days later showed no change in the left side and definite patches of infiltration in the right lung area. An *x*-ray taken April 30th showed a marked clearing of the left side, less infiltration on the right side and the heart only slightly drawn to the left. The last *x*-ray, taken May 20th, shows further clearing of both lung areas, a slight mottling of both apices, a slight generalized increase in lung design and the heart nearly central in position.

On July 8th the patient reported to the office. She had no symptoms, had gained 9 pounds since discharge from the hospital on June 1st, and physical and fluoroscopic examination failed to reveal any abnormal lung signs.

The differential diagnosis in this case is rather interesting. It was first thought that we were dealing with a case of pulmonary tuberculosis. The history of pleurisy, the fever of a degree or two which persisted for two months, the mottling of both apices, the crepitant râles, and the poor state of nutrition all suggested a tuberculous infection. Six sputum examinations, however, proved negative for tubercle bacilli, and recovery occurred. I think it likely that the patient had had an apical tuberculosis at one time.

The probability of some unusual lung infection such as actinomycosis was considered. Sputum examination, however, failed to show any such organism.

The picture was certainly not one of a lobar pneumonia nor of a pleurisy with effusion. Mediastinal displacement too was against either condition.

The case is one of massive collapse of the entire left lung. Whether an infection and enlargement of the left hilus glands was also present, possibly secondary to some lung infection such as a bronchopneumonia which was not recognized before the lung collapsed, is a question. One of the later *x*-ray films showed a definite scattered infiltration of the right lung indicating a definite lung infection which also may have been present in the left lung. This, however, followed the bronchoscopy. I cannot see how the patient could have recovered had hilus gland enlargement due to tuberculosis been the causative factor.

My opinion is that we were dealing with a case of massive collapse of the lung due to simple inanition and accompanying infection the cause of which was undetermined.

DISCUSSION

Dr. A. T. Mann (Minneapolis): This is very interesting to me, this massive atelectasis following a medical condition, for we are more familiar with it, though it is not so very common, in surgical conditions. Pasteur, about 1890, is the first one who called attention to these conditions and reported thirty-four cases following diphtheria. Some years later he also reported some cases after operation.

In regard to the mechanism, it is still in doubt of course, though there are some interesting speculations about it. In the first place it has been found that the bronchioles and even the air cells themselves are contractile. The bronchi and bronchioles have considerable striated muscle tissue in them. The lungs are an outgrowth of the digestive tract and apparently have retained some of the action of the stomach and bowels. Henderson and his co-workers have mentioned that there is at least a rhythmic contraction of the bronchi, bronchioles and air cells about once in 7 or 8 minutes which would help to empty them. Their innervation is by the vagus. The vagus is tonic in its action and I wonder whether that explains in part the reason why we have these things. A reflex through the vagus could very well help to contract the lung cells and bronchioles; then the remaining air will be very rapidly absorbed, taken out through the vessels in the cell walls.

As to the surgical cases, most of them have occurred after ether, or prolonged operations in which the respiration is reduced considerably. The reduction of respiration and the stimulation through the vagus, together, could bring about the condition of atelectasis. We saw in these *x*-ray pictures the condition itself; it looks like a solid body. There is no air in the pleural cavity and practically no air in the air-cells themselves. The chest, diaphragm and mediastinum are all sucked in toward the collapsed lung.

As to the cause being a plugging of the bronchus with mucus, that doesn't seem to me to hold water very well. In the bronchoscopic trials for clearing the bronchus, they only bring out a little mucus such as would be there after the bronchioles had closed down; then there would be a plugging so that the lung itself, after the air had gone out of it, would not fill.

And that brings us to the treatment. Methods have been suggested here. Putting the patients on the well side and having them cough has succeeded in a great many of the surgical cases. The first case in which that happened was a man in St. Louis and this case had resulted after injury about the hip. When fluoroscoping him, the man was in so much pain that they turned him on the other side; the man had a sudden severe pain, coughed, and the lung opened out while they were looking with the fluoroscope. The interest for us surgeons is to give them change in position after an operation, in an attempt to avoid lung complications. The next thing, to my mind, is to give them carbon dioxide inhalations. The respiratory excursion is much reduced after prolonged ether and Nature's method of increasing respiration is the carbon dioxide that is manufactured within us. It has been found that administration of CO_2 will greatly increase the excursions of the lungs. Again, Henderson found that the administration of CO_2 gas was the treatment for carbon monoxide poisoning, so he and his co-workers developed the CO_2 inhalations in carbon monoxide poisoning and it is still the best treatment known. It increases the excursions, it increases the volume of inspired and expired air 30 or 40 liters per minute. And that opens up the lungs, and it has prevented almost all the cases of pneumonia following carbon monoxide poisoning, of which there used to be a large number. We can avoid a great many of our pneumonias probably if we give CO_2 after ether administration. Of course some rare cases have occurred after a local anesthetic and in these the pneumogastric nerve reflex is the probable cause, but the carbon dioxide inhalations will expand the lungs and give them better excursion even in these cases. In a large series of post-operative cases studied by Scott, some 2,000 cases in which carbon dioxide had been administered following the anesthetic and some 2,000 cases in which it had not been used, it was found that the occurrence of massive atelectasis of the lungs as well as post-operative pneumonia was considerably less in the series in which carbon dioxide had been given. My suggestion is that in our hospitals give carbon dioxide inhalations for twenty or thirty minutes after our ether administrations.

Dr. Gardiner (by invitation): I saw this case at Dr. Drake's suggestion. We were impressed with the fact that we were dealing with a massive atelectasis.

I could not help but recall a case which I had seen with Dr. Wm. Lerche, with whom I was formerly associated. This occurred in a child two years of age. This child had a rather acute febrile attack and suddenly became quite dyspneic. The mother thought the child had aspirated a foreign body. *X*-ray showed complete atelectasis of the upper lobe on one side. Dr. Lerche was asked to see the child and bronchoscoped it and could see only a flat bronchus, so flattened that in looking into it you could see the posterior wall flattened out against the anterior. Then he realized that he was dealing with some extra-bronchial pressure. I think he subsequently published that case report. The child went through a course just as this one of Dr. Drake's. Dr. Finklestein, of Berlin, was here at the time and saw the child in consultation and agreed that the child had an acute tuberculosis with acute lymphadenitis. The child was given rest and an anti-tuberculosis regime and has been perfectly well since.

When I saw the bronchus in this case I was reminded of Dr. Lerche's case, for while they did not meet here, they were very close together.

As to what Dr. Mann said in regard to massive collapse and the mucous plug, I feel that there is a good deal to that. Dr. Jackson has found a tenacious mucous plug time and again. He has gone so far as to have some of his workers aspirate some of these patients, subject animals to operation, and inject the material intrabronchially into these animals, and in some of the animals massive collapse resulted.

I still feel that Dr. Drake's case is one of overwhelming infection—whether tuberculous or not, I do not know—with an acute tracheobronchial or bronchopulmonary lymphadenitis. Her subsequent recovery would seem to fit in with such a picture.

Dr. H. B. Zimmermann (St. Paul) reported a case of Spinal Cord Tumor, with operation, referred by Dr. Hengstler of St. Paul.

DISCUSSION

Dr. A. Schwyzer (St. Paul): This is a very pretty case. I had the good luck to see the result a few days ago. The woman walked remarkably well. The idea of injecting lipiodol below and tilting the patient seems a good procedure. The operating of these cases requires the utmost delicacy not to injure the cord the least bit. When you have a complete obstruction of the spinal canal even a difference of 1 mm. is liable to cause much damage to the cord. The case being a meningioma I would say it probably was of rather solid consistency and could be freed very readily from the surroundings. Is that not true?

Dr. Zimmerman: It was quite solid and came out whole.

Dr. Schwyzer: Fortunately, when we have to deal with a meningioma it is well outlined. A week ago I had a case of a large meningioma below the first temporal gyrus and it peeled out readily. If we have a spinal cord tumor within the cord, the condition is very, very much more dangerous; and then a good maneuver (because the least little damage is very serious) is to just incise the cord down to the tumor and do nothing further for a time but close the dura with very finest silk and wait two or three weeks. The cord will gradually deliver the mass more to the surface and it can be removed at a second operation. We all hate to operate a second time, but in a case of this kind what we gain by it is worth taking the drawbacks into the bargain.

Dr. A. Schwyzer (St. Paul) reported the following case, and autopsy:

I made an autopsy on a woman this noon. This woman was brought into the hospital after having been in misery for nine days. She had not seen a doctor until that afternoon. She was 71 years old. She had been vomiting almost constantly, and appeared very bad on admission. The vomitus looked and smelled feculent. Washing out the stomach did not yield much material but very soon after the lavage she vomited feculent material again. She was in no shape for any prolonged examination and it seemed the only thing the old lady could stand would be an enterostomy and we would then have to see if this gave relief. With local anesthesia we made an enterostomy with a large-sized catheter through a McBurney incision. The lowest ileum was very ballooned. We got considerable gas out through the tube and some fluid, but had to coax it with small injections of water. There was no sign of peritonitis. We figured that we had some obstruction and a partly paralytic condition of the small intestine from overdistention. She was given pituitrin, atropin, and later on was given intravenously strong salt solution. (In two cases on the verge of going out, we had given 50 c.c. of 30 per cent salt solution intravenously and it started peristalsis.) The patient grew markedly worse though we always had had some drainage and escape of gas from the tube. Day and night the nurse injected 30 c.c. of 5 per cent salt solution every half hour into the enterostomy tube. Two days after the enterostomy we decided to make a second attempt. Under spinal anesthesia we opened the abdomen large enough to admit the hand. The stomach was empty. She had vomited whatever came back from the duodenum; the jejunum and ileum were very much distended. We did not dare to do much. Another enterostomy was made, a little higher up, and again with a catheter; and again we had escape of gas. We then milked out the contents from many loops. Both the new and the old stoma worked. Still she did not do any better and she died this morning, three days after this second operation. I did not give eserin, as the patient seemed too weak at any time to stand its depressant effect.

The autopsy showed that these two enterostomies had not worked sufficiently. While they were patent and would allow of drainage under some pressure, the guts in the immediate neighborhood of the tubes were ballooned. It occurred to me that the opening was not quite wide enough and if I had the case to do over, with this knowledge, I think I would put in a considerably larger tube. The other findings were an enormous cecum, a ballooned descending colon, and in

the pelvis a big mass. (Diagram on blackboard.) Here was a large mass which looked like a carcinoma, but it was not carcinoma. We had a thick-walled abscess in the wall of the rectosigmoid. The gut was completely stricturcd at this level. I could not find the opening with a probe. After we had cut out the whole area we found at the same level as the thick-walled abscess a pocket with a fecolith in it of about half by one-third inch diameter. This diverticulum also had thickened walls.

It was not possible to make an *x*-ray when the patient came in in the night; she was in no shape for delay; nor would it have done much good. With the very ballooned small intestine it did not seem sufficient to make a colostomy. I think if I had to do it over again I would put in a very large tube or take the gut to the surface and cut it open.

DISCUSSION

Dr. H. B. Zimmermann (St. Paul). I had a case day before yesterday with a baby with acute obstruction and had the same experience. In opening the intestine we emptied one loop of gas and the other remaining loops did not drain. The main thing is to get air out of the small intestine. This baby was vomiting intestinal contents. I injected salt solution, made a laparotomy, and the bowels pushed right out. I aspirated gas and liquid from that loop of the bowel and continued that until I had made twelve openings in the bowel. By that time the abdomen was pretty well collapsed. That was day before yesterday, and today the baby is having normal bowel movements. I think the important thing to do is to collapse the intestinc, and think there is much less trauma in making repeated openings. This is heroic treatment but sometimes heroic treatment is nccessary in these cases.

Dr. A. E. Benjamin (Minneapolis): I have a case at the present time that had obstruction just above the sigmoid with diverticulitis and abscess about as Dr. Schwyzer described it. What I did in the case was to bring the descending colon up through the abdominal wall. I then dissected a fascial strip from the external oblique, passed it through the mesentery and stitched it to the opposite side of the wound, using it as a bridge to hold the colon up. I then stitched the peritoneum around the colon. Through an opening in the colon I passed a tube and washed the bowel out thoroughly. I stitched the tube in place. A gastric lavage was then donc every two to four hours until the alimentary canal was thoroughly cleansed and there was no more regurgitation, after which the bowel then acted through the colostomy opcning.

The patient gradually recovercd, but later devcloped an abscess on the right side which had dissected its way from the area of the abscess duc to the diverticulitis on the left. The patient still has the colostomy opcning. She is up and around a good part of the time, but complains of some pain occasionally.

These cases are very interesting and always a source of annoyance to the surgeon and attending physician.

Dr. Schwyzer (in closing): I think what Dr. Zimmermann said is excellcnt. We have to get rid of the contents of the intestinc. Of course, this patient was an old lady very far gone. We did milk out the intestines. The autopsy showed that the guts were not agglutinated from our manipulations; they were free. The fact that the guts have to be emptied thoroughly, and more thoroughly than we dared do in our case, is a very important one. Whcther it is easier or better, particularly in an old patient, to tap many loops or to milk them down through a tube, is a question.

The meeting adjourned.

Carl B. Drake, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

SURGERY

SUPERVISORS:
DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

THE OPERATION FOR UNDESCENDED TESTICLE: Arthur Dean Bevan (Ann. of Surg., Vol. XC, No. 5, 1929, pp. 847-863). Doctor Bevan emphasizes early operation in these cascs; stating any time after the first or second year as prefcrable. The four reasons for this view are:

1. The structures are more pliable and yielding.
2. The cord is more easily lengthened so the organ can be brought down without tension.
3. There is lcss danger of doing enough injury to cut off the blood supply.
4. There is a better chance for normal development.

The latter opinion is based on the work of Doctor Carl Moore of the University of Chicago, who found that the tcsticles of young healthy animals when placed in the peritoneal cavity gradually degenerated and never developcd to full function, this bcing due to the difference in tcmperature. On the other hand, when these same testicles werc retransplanted to thcir normal position in the scrotum they recovered their full development and function in a short period of time.

Important points in the surgical procedure are:

1. The usc of delicate instruments and catgut.
2. The use of normal saline and hypodermic syringe in separating the peritoneal vaginal process from the cord.

3. Ligation of the upper vaginal process at the internal ring.

4. The use of the lower peritoneal covering as a tunica vaginalis.

5. Purse string suture at the neck of the scrotum to maintain the testicle.

6. The canal is closed with the cord deeply situated; the transversalis and internal oblique are sewed to the shelf of Poupart's ligament over the cord.

C. W. Mayo, Jr., M.D.

PEDIATRICS

SUPERVISORS:
CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS
ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

FORTY-TWO CASES OF APPENDICITIS IN CHILDREN OCCURRING DURING AN EPIDEMIC OF UPPER RESPIRATORY TRACT INFECTION: Harold J. Freedman, M.D., Boston (Arch. of Ped., October, 1929, Vol. XLVI, No. 10). Concerning the age incidence, the youngest of a group of forty-two were two children of two years, both of whom had a ruptured appendix. Abt reviewed eighty such cases, in which twenty patients were less than three months of age.

Although in a series the temperature is moderately increased in acute non-perforated appendicitis and definitely increased in those cases showing perforation, we must not overlook the important fact that in individual cases the temperature is of little decisive value. A table shows the average pulse to be elevated but very high in the cases with perforation. Nevertheless, the pulse is a more accurate sign of toxicity than the temperature or the leukocyte count.

LEUKOCYTE COUNT

George Aldous laid great stress on the white blood count and said that all doubtful cases with a count of 15,000 to 30,000 should be explored. Russell Fowler reported an average count of 19,100, with an average polymorphonuclear count of 89.7 per cent, in a series of cases. Alfred Noehren believed the differential leukocyte count to be of more value than the count itself. A leukopenia in the presence of a pathological appendix is indicative of marked toxicity.

As a rule, closely following the first attacks of pain, there are gastrointestinal symptoms. The high percentage of those who vomited is striking proof of the extreme importance of this symptom. We must remember the possibility that many acute appendices occur as a consequence of upper respiratory infection. Brenneman emphasized the value of localized physical findings such as tenderness, spasm, or rigidity, and remarked that the white blood count was not a great contributory finding so far as differential diagnosis was concerned.

1. Perforation was frequent in the earlier years.

2. The finding of an increase in the white blood cells in the urine is quite common in appendicitis.

3. Post-operative discomfort was reduced in the toxic cases by repeated administration of saline hypodermoclysis.

4. The finding of localized tenderness and spasm in the abdomen is more important than any other clinical signs in the diagnosis of appendicitis.

R. N. Andrews, M.D.

INFANTILE PYLORIC OBSTRUCTION—PRELIMINARY REPORT OF ITS ALLERGIC NATURE: Milton B. Cohen, M.D., and Joseph Breitbart, M.D., Cleveland (Amer. Jour. of Dis. of Children. October, 1929, Volume 38, Number 4). In spite of much clinical observation, infantile pylorospasm and pyloric stenosis remain obscure in etiology and in their relationship to each other.

If, on the administration of atropine and on a thick diet, the child improves, the case is one of pylorospasm; if no improvement follows these measures or if the symptoms continue to grow worse despite them, a diagnosis of organic obstruction is made and operation is advised. Pathologic evidence is borne out by the clinical fact that most of these infants take food normally and show normal growth curves for from a few days to a few weeks, when suddenly the symptoms begin.

It can be seen that the vomiting and visible peristalsis common to this disease result from pyloric obstruction, either completely spasmodic or combined organic and spasmodic in origin, with the symptoms following completion of the obstruction by the smooth muscle spasm with its accompanying edema and exudation.

Ratner has demonstrated experimentally that allergic antibodies can pass through the placenta of the guinea pig and passively sensitize the offspring. He has also succeeded in administering the sensitizing dose of horse serum to the guinea-pig fetus by injecting the substance into the mother a few days before parturition, and has demonstrated that sensitization, which was not present at birth, developed within a period of one month.

The only essential difference between those cases of pyloric obstruction which show hypertrophy and those which do not show it may be in the time of onset of sensitization and its duration. Patients with organic pyloric obstruction are probably sensitized in utero early in prenatal life. Repeated shocks probably occur during prenatal life with the resulting secondary hypertrophy. After birth the child may develop normally for a few days until it receives a dose of the specific allergen, and this institutes further spasms and edema with its resultant signs.

(1) The pathologic condition in infantile pyloric obstruction is probably identical with that in allergy.

(2) Evidences of allergy are present in the majority of cases of infantile pyloric obstruction.

(3) Depending on the period in life at which sensitization occurs and the frequency and severity of the shock reactions, there may be pylorospasm with or without organic obstruction.

R. N. Andrews, M.D.

ROENTGENOLOGY

SUPERVISORS

LEO G. RIGLER

MINNEAPOLIS GENERAL HOSPITAL, MINNEAPOLIS

A. U. DESJARDINS

MAYO CLINIC, ROCHESTER

X-RAYS IN THE DIAGNOSIS OF EARLY CARCINOMA: H. Haudek (Brit. Jour. of Radiology, V. 2, p. 421, September, 1929). Cancer of the stomach is still a very fatal disease due chiefly to late diagnosis. There are four principal causes for this:

1. The latent period during which the patient has no symptoms or they are not localizing.
2. Delayed *x*-ray examination due to reluctance of both doctors and public to utilize the *x*-ray method.
3. Faulty *x*-ray investigation, that is, insufficient, careless examination by untrained individuals.
4. Faulty methods in the radiological investigation.

The author discusses chiefly the latter point and makes suggestions based upon his experience. The use of the barium-filled capsule to determine the slightest hindrance in the lower end of the esophagus or cardia of the stomach is strongly advised.

The use of a small amount of a thick barium emulsion for the examination of the contracted stomach and its folds is advocated. In this way very small ulcer niches, tumor craters and small filling defects may be found. Films are also made with pressure applied by means of pads. The completely filled stomach is then observed in the usual way. The prone position must always be used.

The author has been able by the *x*-ray method to determine the presence of slight carcinomatous changes in the gastric wall—very early diagnoses in a few cases. Numerous cases including benign tumors of the stomach are cited to support this assertion. In the post-war period he has not failed to diagnose carcinoma when it was present in any case. The possibility that carcinoma might be erroneously diagnosed when no lesion existed should be considered. He has had no failures in this respect. The distinction between a prepyloric benign ulcer and a malignancy, however, is much more difficult, at times impossible. The frequency with which ulcers in this region undergo malignant degeneration should make their treatment surgical so that the distinction is not so important.

LEO G. RIGLER, M.D.

PULMONARY TUBERCULOSIS OF INFANTS AND CHILDREN: Rolla G. Karshner, M.D. (Amer. Jour. Roent. & Radium Therapy, Sept., 1929, Vol. XXII, 226-234). The author presents a study of proved pulmonary tuberculosis at the children's hospital, most of the cases having been studied for weeks, months or years prior to postmortem examination. The classification used is based on the appearance and distribution of the infiltrations on the roentgenogram as primary glandular, hilus, miliary and adult tuberculosis.

The focal primary lesion of tuberculosis is almost always undetected. It is seen later as a calcified remnant, usually in a lower lobe. Tuberculosis of the intrathoracic lymph nodes is generally diagnosed roentgenologically. The enlargement is often extreme in infants. Tuberculous hilus glands may cause all the phenomena commonly associated with foreign body in the air passages. In children, it can rarely be stated from the roentgenogram whether disease of the intrathoracic nodes is the cause of the symptoms present. Calcification rarely, if ever, occurs in other than tuberculous hilus glands. Hilus tuberculosis originates at the root of the lungs and extends outwards a variable distance. Miliary tuberculosis may be a terminal phenomenon in any type of tuberculosis. Occasionally healing occurs. In infants it usually accompanies tuberculous meningitis. The adult form is rare before the twelfth year.

JACOB SAGEL, M.D.

SIGNIFICANCE OF GAS UNDER THE RIGHT DOME OF THE DIAPHRAGM: E. P. Pendergrass, M.D., and Elizabeth Kirk, M.D. (Amer. Jour. Roent. & Radium Therapy, Sept., 1929, Vol. XXII, 238-246). The authors present several cases in which the finding of gas under the right dome of the diaphragm by *x*-ray examination helped to crystallize the opinion justifying subsequent operation. The demonstration of gas is made by films taken in the lateral and anteroposterior positions, especially in the lateral position. In the case of gas within a subphrenic abscess, the gas usually lies above a fluid level which has the shape of a segment of a circle and there is a definite wave effect of the fluid after shaking the patient. In the case of hepatoptosis, the haustrations of the colon can be seen under the dome of the right diaphragm. Transposition of viscera with the stomach on the right side can be demonstrated by a barium meal and a plate showing the heart on the same side. Gas under the dome of the diaphragm following an operation can be ruled out by the history of the preceding operative procedure.

The article is illustrated by many plates showing the conditions mentioned. An extensive bibliography is appended.

JACOB SAGEL, M.D.

AMERICAN PUBLIC HEALTH ASSOCIATION OFFERS LIFE MEMBERSHIP

The American Public Health Association has recently arranged a life membership status for its members and fellows. Applications must be approved by the committee on eligibility and accepted by the Governing Council. Thirty life members were created at the recent Minneapolis convention. The cost of life membership is $100.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:
VIRGIL J. SCHWARTZ,
PHYS. & SURG. BLDG., MINNEAPOLIS
ARTHUR C. DEAN
CROOKSTON CLINIC, CROOKSTON

CONDITIONS OF THE OPTIC NERVE CAUSED BY DISEASE OF THE SINUSES: Thompson, New York (Arch. of Otolaryng., Sept., 1929, Vol. X, No. 3, p. 248). Of the various conditions of the eye due to disease of the sinuses, none are so well recognized or established as disease of the optic nerve. There are today few ophthalmologists who on seeing an inflammation of the optic nerve do not send the patient to a rhinologist for a report as to the presence of ethmoiditis or sphenoiditis. From these reports it is evident that there is a large class in which no intranasal symptoms occur. These are known as the latent sinus infections. In many of these cases results have been so good from operations that the practice of operating on these so-called latent sinuses in the presence of suggestive symptoms in the eye became established and continues until the present time. It became evident that the nasal symptoms could not be depended upon.

There are three types of optic nerve disease occurring as the result of sinus disease: (1) Retrobulbar neuritis; (2) plastic neuritis; (3) sudden functional depression with no change in the appearance of the optic nerve.

It seems that in the sinus infections with pus the mucosa is thickened and walls off absorption, while in the latent cases the mucosa is thin and the infection spreads directly into the bone. When the optic nerve is concerned the condition is almost always in the posterior ethmoids and sphenoid.

ARTHUR C. DEAN, M.D., F. A. C. S.

HEALTH WORK AT A STATE FAIR

The September issue of the *Nebraska Medical Journal* has the following editorial on health work at the State Fair:

"As you know, the state health work and exhibits at the State Fair are now under the supervision of the Nebraska State Medical Association. We have been putting in some extra work on the proposition this year, and are really desirous that the doctors of the state visit that department.

"We have the examinations for adults, the Four H Club, the babies, and some exhibitions, lectures, and reels on contagious diseases, particularly diphtheria prevention. In the babies' department we are planning for some reels and slides in addition to the examinations of the babies, and possibly some lectures. We have really put a good deal of work on the proposition this year and are desirous of constructive criticism."

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

TULAREMIA. Walter M. Simpson, M.S., M.D., F.A.C.P., Director Diagnostic Laboratories, Miami Valley Hospital, Dayton, Ohio; formerly Senior Instructor in Pathology, University of Michigan. 162 pages. Illus. Cloth, $5.00. New York: Paul H. Hoeber, Inc., 1929.

CLINICAL MEDICINE FOR NURSES. Paul H. Ringer, A.B., M.D., formerly Chief of Medical Service of the Asheville Mission Hospital, Asheville, N. C. 330 pages. Illus. $3.00. 3rd revised edition. Philadelphia: F. A. Davis Company, 1929.

PRACTICAL MASSAGE AND CORRECTIVE EXERCISES. Hartvig Nissen, Late President, Posse Normal School of Gymnastics. 5th edition revised and enlarged by Harry Nissen, President, Posse Normal School of Gymnastics, Boston. 271 pages. Illus. $2.50. Philadelphia: F. A. Davis Company, 1929.

THE NUTRITION OF HEALTHY AND SICK INFANTS AND CHILDREN. E. Nobel, Professor of the University and First Assistant; C. Pirquet, Late Professor of the University and Director; and R. Wagner, Associate Professor and Second Assistant, University of Vienna, Children's Hospital. 2nd revised edition. Authorized translation by Benjamin M. Gasul, B.S., M.D., Consulting Pediatrist, Municipal Tuberculosis Sanitarium, Chicago. 243 pages. Illus. $3.50. Philadelphia: F. A. Davis Company, 1929.

DISORDERS OF THE SEXUAL FUNCTION IN THE MALE AND FEMALE. Max Huhner, M.D., Chief of Clinic, Genito-urinary Department, Mount Sinai Hospital Dispensary, New York City. 3rd edition. 342 pages. Philadelphia: F. A. Davis Company, 1929.

ANGINA PECTORIS. Harlow Brooks, M.D., Emeritus Professor of Clinical Medicine, New York University. (Harper's medical monographs.) 172 pages. Price, $2.50. New York and London, Harper & Brothers.

This book is not a review of the literature already published, but a thorough study of the subject from the consulting physician's viewpoint. Dr. Brooks assumes a new outlook for angina patients, or those predisposed to this disease by reason of heredity or other etiological factors, advancing the idea that angina may not be fatal, or if treated in the early stages the result may be regarded as an effective cure. It is possible, he contends, to so regulate the lives of those predisposed to this condition that they may escape it.

The author has discussed the etiology so far as it is known at the present time and has given careful consideration to the pathology and pathologic physiology as developed from his observation. Symptomatology, in-

cluding obscure types of syndrome, differential diagnosis, especially between true and false angina, and detailed treatment, are presented clearly and comprehensively.

A. E. Cardle, M.D.

A SURGICAL DIAGNOSIS. J. Lewi Donhauser, A.B., M.D., F.A.C.S., Clinical Professor of Surgery, Albany Medical College. 799 pages. Price $10.00. New York: D. Appleton, 1929.

In the preface, the writer gives an excellent illustration of how surgical diagnosis should be taught to medical students.

This book was written essentially for medical students, hospital residents and general practitioners. It contains a vast amount of data and numerous charts. There are etiologic charts, regional and anatomic charts and differential charts which, if taken in conjunction with history taking and examinations, should be of vast assistance.

From the use of the large number of charts alone one would not have a great deal of trouble in making a surgical diagnosis.

O. S. Wyatt, M.D.

OSTEOMYELITIS AND COMPOUND FRACTURES. H. Winnett Orr. 208 pages. $5.00. St. Louis; C. V. Mosby Co., 1929.

One is interested in reading this book by Dr. Orr, dealing with the treatment of osteomyelitis and compound fractures, to find that all the steps or parts of his method are ones previously advocated, in part at least, by various surgeons from the time of Paré. Dr. Orr is to be commended highly for the very effective way in which he has brought these ideas together and emphasized them.

The first chapter, dealing with the history of antisepsis from the time of Lister, adequately sets forward the ideal method of treating wound infections. This method briefly is to allow the wound as great an opportunity to heal as is possible, by not changing the dressings too often and by not using a wide variety of irritating antiseptics. It is in this frequent dressing of wounds that the damaging secondary infection is produced. Dr. Orr's reference to Dr. Alonzo Clark, "Don't treat your patients too much. Let them get well if they can," is very timely.

The second chapter deals with the condition in fracture and injection treatment prevalent during the war. The changes in the viewpoint of the war-time surgeon is immobilization of fractures, treatment of infections, and development of "orthopedic viewpoints" is most interesting.

Chapter three deals with osteomyelitis specifically. Numerous references to Dr. Starr's excellent work on osteomyelitis are made and full description of the treatment of osteomyelitis by Orr's method is given and numerous case reports are used to illustrate various types of infections or complications in the course of the disease. The results of treatment are most encouraging and instructive.

Chapter four, dealing with the application of Orr's method to the treatment of compound fractures, is new and individual. It must be said that not many surgeons could enclose a compound fracture in plaster-of-Paris without feeling very nervous about the ultimate outcome. Dr. Orr shows very convincingly that his method is easy and most applicable in this type of case. Again, case reports are used to prove all assertions made and the end-results seem to be uniformly good.

Chapter five is devoted to the clinical results obtained by various surgeons using Orr's method. All of these reports undoubtedly are picked cases, show excellent results and prove conclusively all the good points of the Orr method.

The book is well illustrated with pictures and case reports and is a very readable one.

Geo. A. Williamson, M.D.

YOUNG MEDICAL MAN would like to take over some doctor's practice temporarily or permanently beginning January 1. Apply Dr. S. E. Horwitz, Iowa Methodist Hospital, Des Moines, Iowa.

FOR SALE—Standard *x*-ray equipment, combination table, fluoroscope, developing tank, Alpine lamp. G. L. Merkert, 1527 E. Lake Street, Minneapolis.

WANTED—302 Lowry Building. Physician to share fully equipped, nicely furnished office. Reception and examining rooms including light and telephone. $30 monthly.

WANTED—Single doctor, recent graduate, to do Contract Practice. Good salary. Address D-49, care Minnesota Medicine.

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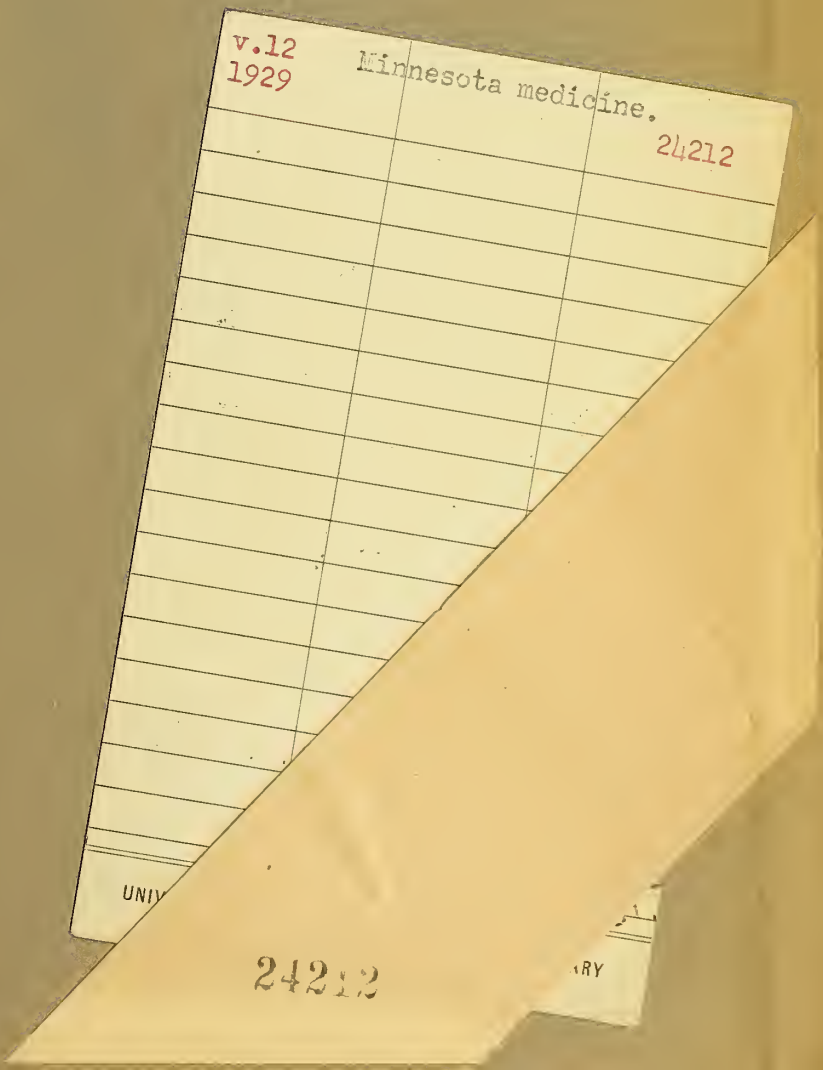
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